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Case 1 Creedy thickened and indurated terminal ileum with in solvement of mesenteric glands

Case 3 Regional enteritis involving two segments of the ileum Note the enlarged mesentene glands

SURGERY

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VMBER I

REGIONAL ENTERITIS

ARNOLD S JACKSON, M.D., FACS, Madison, Wisconsin

O SUBJECT in surgery bas created more discussion and interest in so short a period as has regional ileitis, as it was first designated by Crohn (10) and his associates in 1932 Although only a years have elapsed since their article twenty-seven treatises dealing with this disease bave appeared in American medical literature. The subject has aroused the interest of surgeons, internists, roentgenologists, pathologists, and research students As it has not previously been discussed before this society, opportunity is taken to present our cases with a summary of those of other members. To the 114 cases which have appeared in the American literature, there are added 4 in our series and 64 from the members of the society, making a total of 182 cases I wish to pay recognition to the excellent article appearing on this subject in SURGERY, GYNE-COLOGY AND OBSTETRICS, by one of our memhers Dr Karl A Meyer

As one becomes familiar with its rather characteristic symptoms, he is inclined to conjecture how many such cases he may have overlooked prior to 1932. Even now, undoubtedly many innocent appendices are being removed while the real source of the discomfort is overlooked. If more need be said

as to the inadequacy of the formerly popular hutton hole incision, it might be urged that even the remote possibility of ileitis den ands an adequate abdominal exploration when conditions permit it. Regional enteritis, mesentenic lymphadenitis, a diseased Meckel's diverticulum, and lesions of the gall bladder and pelvis are but a few of the pathological entities which, through inadequate exposure, may escape the surgeon's eye

Mesenteric lymphadenitis is undoubtedly akin to regional enteritis, both possibly being due to low grade infections of the lymphatic system Both are baffling as to diagnosis and The classical paper of Leonard Freeman first focused our attention on that then mysterious entity, mesenteric lymphadenitis, now so well known that occasionally it may be diagnosed prior to operation. This condition also should not be overlooked at operation, for such patients may likewise continue to complain of abdominal distress for months following an appendectorny. It behooves the surgeon to explain this to relatives at time of operation Everett Coleman has told us that fortunately in the majority of these cases recovery eventually takes place

Probably both lesions are due to a diseased lymphatic system. Lymphadenitis is characteristic of the former and may occur in the latter. In one of our cases the most striking appearance when the abdomen was opened

I

From the Jackson Clinic.
Presen ed before the Western Surgical Society at Kansas City
December 11 1036.



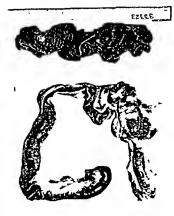


Fig 1 Specimen of the terminal ileum the cecum and part of the ascending colon

tion of the small intestine A mass is usually palpable Violent cramps, occasional attacks of vomiting, and constipation occur

Group 4. In this stage multiple fistulas are formed that may open either internally or externally through the abdominal wall Roent-genological examination may reveal these fistulas, which persist and resist surgical measures at closure, unless the bowel is resected

The symptoms depend somewhat upon the location of the lesion, the higher the construction the more pronounced are the symptoms of a bigh intestinal obstruction. The extent and the severity of the lesion determine the predominant symptoms. The most typical cases I have observed are those in young adults suffering from acute colic-like addominal pains usually occurring 1 to 2 hours after eating, with nausea and vomiting. The pain in these cases is intermittent and yet severe enough to require morphine. Visible peristals may be observed. The age range has been from 16 to 56 years.

Determination of the diagnosis depends upon the roentgenologist. In the early stage



Fig 2 Resected portion of the ileum

the roentgenogram may reveal no characteristic lesion but as the chrone, stenoite form develops a filling defect in the terminal ileum with a mild ileal stasis and distention proximal to the defect appears. In cases with still greater stenosis, the lumen shows merely as a fine line of barium, described by Kantor as the "string sign." He has also called attention to three other significant roentgenological findings, namely a filling defect just proximal to the cecum, an abnormality in contour of the last filled loop of ileum, and dilatation of ileac loops just proximal to the lesion.

Various conditions must be considered in the differential diagnosis, such as acute appendicitis, mesenteric lymphadenitis, ileoce cal tuberculosis, intestinal obstruction, ulcerative colitis, neoplasm, and actinomycosis

Pathological findings vary according to the stage of the disease The involved section of



Fig. 3. Regional enterities showing marked involvement of the terminal ileum with enlarged mesenteric glands

bowel, together with its mesentery, is greath, thickened and doughy, like a soggy hose. In the acute stages the diseased intestine may appear edematous and hyperemic or congested and of rather a maroon color. Mention has been made of the hyperplastic regional mesen teric glands. The mesentery may not be thickened and defematous. Karl Meyer believes that the state of the mesentery may be an indication as to treatment that is, whether to resect, shortcircuit, or leave alone.

The inflammatory process may be limited to one segment of the bowel or as in one of our series, may involve several loops. Fis tulas and walled off abscesses may be found between the loops of bowel. The intestinal coats are greatly thickened and edematous Ulcrated areas may appear along the mesen teric border of the mucosa and show a tend ency toward perforation. Microscopic study shows acute, subacute, or chronic inflamma tory changes. Giant and epithehoid cells are present in the later stages.

TREATMENT

Proper surgical treatment is still a question for discussion and will not be determined until the results in cases in which operation has been done have been further studied

Treatment must be governed by the progress of the disease and the condition of the patient Many acute cases must occur in which spon taneous recovery results. What is the proper procedure when the acute phase is encountered? Mixter prefers a one stage resection in uncomplicated cases but feels that multiple stage operations are indicated when abscesses or fistulas exist. He believes that the hazards of operative intervention should be emphasized and points out that technically the operation is difficult due to severe hemor rhage caused by mobilization of the bowel, the extreme thickening of the mesenters, and at times the presence of complicating fis tulas Mixter does not favor graded procedures in the early cases and reports that he had no case in which a cure was accomplished short of resection of the diseased intestine

Meyer believes that if the inflammation is imited to the terminal ileum and the mesentery is unmvolved, resection may not be necessary, since the process may resolve spontaneously. Even when ulceration of the ileum has extended into the mesentery, he feels that a shortcircuiting operation may suffice This was my experience in Case 3 of our series

I question the advisability of subjecting these rather poor surgical risks to the hazards



I ig 4 Filling defect in the terminal ilcum opaque meal administered by mouth

of resections of considerable portious of the small and large intestine. It might be well to permit sufficient time to clapse to observe what course the disease might follow is contrary to Mixter's experience, who states that he has observed in a very considerable number of eases without demonstrable fis tulas or abseesses that the disease has pro gressed from a simple primary lesion follow ing a first stage procedure, so that the second ary operation became definitely more hazard ous Mixter reports a mortality of 36 per cent Dixon, however, feels that if the patient is in poor condition, an ileocolostomy is the procedure to be employed, subsequent resection depending on whether the patient is rendered symptom free by the shortcircuiting operation. He believes that in more than 50 per cent of the cases resection will be necessary

What is the fate of the sidetracked loop of bowel. In Case 3 in our series, roentgenological examination disclosed no abnormal changes. This is still open to discussion, as Holm found that the loop was likely to become greatly clongated, dilated, and ulcerated.

CASE REPORTS

The subject of regional enteritis merits our closest attention and our carefully considered



tig 5 Specimen injected after resection shows a characteristic filling defect

opinion. In order that future knowledge and experience in the care of this strange muladly may be available to all, this preliminary study should be followed by a later survey. A summary of the cases seen at the Jackson Clinic together with a resume of those of members of the Western Surgical Society follows.

CASE 1 Temale, aged 56, years was first seen by my brother in 1909, at which time her age was 29, she had recently had four attacks of right lower quadrant prin vomiting and diarrhea. A diagnosis of appendicitis was made and an interval operation was done At operation, free, clear, ascitic fluid, grade 1, was noted. The wall of the terminal 21 inches of the ileum was found to be definitely thick ened edematous, anomie, and dusky in appearance The appendix, which showed no evidence of acute inflammation, was removed. At the time, the water logged doughy condition of the terminal ileum with its dusky hue which also pervaded the fan shaped vascular supply area, was interpreted as due to a hmited mesenteric thrombosis in which recovery of circulation was progressing favorably. Judging by subsequent history, this was the initial stage of a terminal ileitis

From time of operation until 1922, patient had had attacks of abdominal cramps and comiting which occurred every few months and lasted 2 to 3







Fig 8 Arrow points to concave filling defect in ileal cecal valve caused by protrusion of infiltrated ileal wall into occum

There had been marked loss of weight and strength with secondary anemia Roentgenological examina tion had not revealed the cause of the complaint

Explorators laparotoms revealed a most unusual and in our experience, unheard of condition. The first 3 feet of the jejunum presented what we now know to be the characteristic appearance of regional enteritis. On account of the location and extent of the lession, resection was not feasible. The terminal duodenum and the proximal jejunum with their greatly thickened walls were approximately the size of the colon but gradually tapered off into normal walled jejunum. There was no proof of definite obstruction. The adjacent mesenters contained many enlarged glands. The patient survived a year

Cise 3 Male, aged 26 entered the bospital December 3, 1935 In March, 1935, patient suffered with abdominal cramps, bloating, and diarrhea Blood appeared in the stools 2 weeks later Fol lowing appendectomy at another bospital in May, 1935 pain and diarrhea were relieved but persisted In late November 1935, the abdominal cramps again became severe During height of cramps, a mass was felt in abdomen which disappeared with ecssation of pain Total loss of weight 40 pounds

Proctoscopic examination showed spastic bowel, edematous mucosa, but no evidence of ulceration



Fg 9 String sign in terminal ileum

Blood examination showed hemoglobin 75 per cent red blood count 5,500 000 white blood count 12 500 The kahn test gave negative reaction

Reentgenograms of the gastro intestinal tract showed that in the preceal ileum there was can nulzation of the lumen, and next to this marked dilatation. At 24 hour intervals, this cannulization was again demonstrated in the ileum, with retention provimal to the defect

Diagnosis regional ileitis

Operation was done December 11, 1935. The lower ileum was explored and re-called a marked narrowing thickening, and hypertrophy of the wall in the last to inches, with many enlarged glands in the mesentery. The health yileum wall above the lesion was anastomosed to the ascending colon. The patient made a good recovery.

Following the operation there were occasional attacks of dull pain lasting 2 to 5 hours, which gradually subsided Patient is now a vear after operation free from all symptoms, bas gained 50

pounds, and eats whatever be desires

CASE 4 Female, aged 16 vears This grif was ad mitted to the clinic March 17 1936. Onset of present illness was in August, 1935, when she had ab dominal cramps and vomited. A month later a similar attack occurred. In October the attacks became more frequent and in November the pain became localized in the right lower quadrant, she was operated upon elsewhere. The surgeon reported that on opening the abdomen he encountered an agglutinated mass of small bowel around the appendiceal region and in digging out the appendix, he opened a



Fig to I centgenogram showing string sign in the ter minal ileum



Fig 12 Roentgenogram showing 4 hour retention in the terminal ileum



Fig rr String sign in terminal ileum

small abscess of creamy odorless pus in the meso appendix. The appendix itself was not greatly in flamed nor was it perforated. After the appendix tomy, a cgarette drain was placed to the site of the pus pocket the resulting sinus remained patent for pus pocket the resulting sinus remained patent for abdominal pain and vomiting continued with the development of anemia loss of weight and general lassitude. Temperature ranged from 100 to 101 degrees



Fig. 13 Regional enteritis showing enlarged mesenteric glands and hose like thickening of the last 8 inches of the ileum.

TABLE I -- CASES OF REGIONAL ENTERITIS MEMBERS OF WESTERN REPORTED BY

SURGICAL SOCIETY

Exploration

	Cases
Number of cases	64
Number operated upon	6.4
Result	
Cured	50
Improved	3
No change	1
Died	10
Type of operation	
Shortcircuit ileacolostomy	14
Resection	49
Appendectomy	0
Members reporting not having hid a case	45

TABLE II -- CASTS OF REGIONAL FINTERITIS REPORTED BY JACKSON CHINIC

	Cases
Number of cases	5
Number operated upon	4
Result	
Cured	3
Improved	0
Died (1 year following operation)	1
Type of operation	
Shortcircuit ileocolostomy	1
Resection	2

A ray diagnosis obstruction at the ileocecal valve

Clinical diagnosis terminal ileitis Operation was done March 18, 1936 A typical hose like thickening of the last 18 inches of the ileum was found with several enlarged mesenteric glands

Surgical diagnosis regional ileitis The affected ileum and half of the ascending colon were resected and lateral anastomosis was done

Figure 13 shows specimen during operation, and Figure 2 (below), specimen after removal The fresh specimen was sent at once to Professor C H Bunting who at first thought the etiological factor was due to a fungus organism but repeated efforts to culti vate this organism failed. Figure 5 is a roentgeno gram of the barium filled specimen. There is a materia reduction in the lumen of about 20 cents meters in the distal ileum with cannulization in the prececal region

Diagnosis inflammatory infiltration of the wall of

the distal ileum (regional ileitis)

Patient has remained well since operation

CASE 5 Temale, aged 35 years, was first seen at the clinic March 31, 1936 For 2 months, she had had daily attacks of cramp like pain in the lower abdomen lasting 2 to 3 hours The pain occurred usually after the noon meal and was partially re heved by lying on the abdomen No borhorygmus and no nausea or vomiting were associated with the pain, the bowels were constipated and the daily use of a laxative was required

Blood examination showed hemoglobin, 75 per cent, red blood cells, 5,400,000, white, 7,000

TABLE III -- REPORTED CASES OF RIGIONAL ENTERITIS IN THE UNITED STATES

		Cases
1032	Crohn B B, Ginzburg, I, Oppenheimer,	
- 73 -	G D	14
1933	Clute, If	2
1933	Harris, I I , Bell G H , Brunn, H *	3
1933	Homans I. Haas (, VI	2
1933	I add (Reported in discussion)	2
1933	Rockey, I W	4
1934	Brown P , Bargen J 1 , Weber, H	18
1934	Colp R	1
1934	Core P Boeck W	1
1934	Donchess, J. C., Warren S.	I
1934	Stout, I , Hoagensen, Smith	1
1934	De Courcy J I	1
1934	Bissell, A D	2
1934	Philips K T	1
1935	Frb, I H Farmer A W	4
1935	Frdmann J I , Burt, C V	5
1935	Galamos A Mittelmann W	
1935	Mixter C G	11
	Lee Discussion Mixter paper	I
1936	Goetsch I Discussion Mixter paper	1
	Brunn, H * Discussion Mixter paper	2
1936	Binney Discussion Mixter paper	2
1936	Strauss, A , Rosenblate, A Goldsmith A	1
1936	Meyer, k	8
,	Reported in this Survey	2
1936	Connell, I G	2
1936	Crohn, B , Rosensh B	9
1936	Probstem J G , Gruenfeld, G	3
1936	Kantor J L	
1936	Taylor, J L	2
1936	Jackson, A *, R II *	.4
1936	Western Surgical Society Members	64

NOTE. Crohn recently reports a diagnosis of 60 cases or 37 more than already reported making a total of any cases reported in the United States to date "Viember Western Surgical Society

The gastro intestinal series of roentgenograms showed conspicuous evidence of cannulization of a loop of distal ileum immediately prececal ("string sign") Colon, by clysma Reflux into the ileum confirms the presence of a filling defect in the distal ileum as previously described

Diagnosis inflammatory infiltration into wall of distal ileum Clinical diagnosis regional ileitis

Operation was advised but refused, patient has not been seen since

SUMMARY

1 To the 114 cases of regional enteritis which have appeared in the American literature since Crohn's classical description in 1932, there are added 4 cases from the Jackson Clinic and 64 from a survey of the Western Surgical Society, making a total of 210 cases

2 Regional enteritis may simulate appendi citis and appendectomy has frequently been performed without relief of symptoms

- 3 This disease, like mesenteric lymphadenitis, is probably due to a low grade infection of lymphatic system. Its ctiology is unknown
- 4 The symptoms depend upon the stage, the location, and the severity of the disease

The important symptoms are pain, often severe and cramp like diarrhea vomiting fever and loss of weight A mass may he palpated

6 The disease may occur in either the small or large intestine but is most often observed in the terminal ileum

7 Determination of the diagnosis depends upon the roentgenologist \ filling defect in the terminal ileum distention proximal to the defect and the characteristic string sign are typical

8 Pathological andings vary according to the stage of the disease. The thickened mes entery, enlarged glands and the hyperemic enlarged hose like intestine are typical

- o Proper surgical treatment is still a ques tion for discussion. In 2 cases in this series resection was performed and in another eleocolostomy with equally satisfactory results
- 10 The type of operation to be performed depends upon the individual case Resection is not advised in debilitated patients. In some cases entero anastomosis will not suffice and resection will be required to relieve symptoms

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THE ADVANTAGES OF GRADUAL DECOMPRESSION FOLLOWING COMPLETE COMMON DUCT OBSTRUCTION

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THE effects of the rapid release of increased intravisceral pressure in most of the systems of the body have been studied and described Creevy stated that the Ebers Paparus gives a method for preventing the too rapid withdrawal of urine from the distended urinary bladder. Although Creevy thought that the effects of sudden relief of the greatly distended bladder were overestimated, Van Zwalenburg, Hirsch, Camp bell, Bumpus and Foulds, and many others, believed that renal and circulatory collapse did at times follow sudden bladder and urinary tract decompression Bumpus and Foulds stated that 'if the chronically distended bladder is emptied rapidly and completely at one time, the sudden reduction of the intravesical pressure results in immediate congestion throughout the urinary tract with resulting edema and hemorrhage which may be so severe as completely to suppress renal function "

Plumer, Thorngton and Schmidt, and others have studied the effect of increases in the abdominal pressure on the arterial and venous pressures. Brams, Katz and Kohn have reported on the effect of abdominal distention and release on the blood pressure in the carotid artery and the veins above and below the diaphragm. They observed that after the release of marked abdominal distention which had persisted for some time, the fall in arterial pressure was as much as 40 millimeters of mercury. They wisely cautioned that such a drop "in a feeble patient might result in death."

McLaughlin and Levering found that "the rapid release of the (greatly increased) intragastric pressure, even when this had been maintained for only a short period, resulted in profound changes in the arterial system"

From the H.-rrison Department of Surgical Kesearch and the Department of Surgery School of Medicine University of Penn sylvania Aided by a grant from the Josiah Macy Jr Foundation

Elman has reported on the acute crises that are observed in certain cases after the sudden release of a greatly distended intestine, especially the small bowel. This reaction similated shock in many respects and a number of the cases cited progressed steadily to a fatal outcome. A precipitous fall in blood pressure has been noted in such cases. Aird has produced the same train of events in experiments designed to study the effect of rapid defiation of the distended bowel.

For some years we have been interested in the pathologic physiology of common bile duct obstruction. Certain of the changes which are observed once the common bile duct becomes obstructed are not unlike those observed after obstruction in other viscers. We wish to discuss certain of the changes incident to common bile duct obstruction together with what we believe to be a rational plan of management following removal of the obstruction.

Changes in the liver cells following common duet obstruction. When the common bile duet becomes obstructed the liver cells continue to secrete bile until the intraductal pressure reaches the secretory pressure of the liver. The time at which this suppression of secretory activity of the liver cells occurs depends in large part upon the state of the gall bladder at the time of the obstruction and the condition of the liver.

If the gall bladder is capable of absorption, ble may continue to be secreted for hours, while if the gall bladder is so damaged that absorption through its wall is no longer possible, or worse still, if it is so severely damaged that fluid pours into its lumen from the wall, the intraductal pressure may rise so abruptly that secretory suppression of the liver results within a very few hours

The hver is at best an organ which cannot be rapidly distended to any great extent. The capsular covering of this organ does not so



Fig 1 Pholomicrograph showing appearance of the normal liver X00

readily accommodate itself to increases in intravisceral tension as do the hollow viscera Furthermore when as a result of infection there exists considerable cirrhosis distention becomes more difficult and the problem even more critical

The intrahepatic ducts dilate at the expense of the hepatic cells and blood vessels portal venous circulation suffers most Normally the portal pressure is low and as the intraductal pressure increases the flow of portal venous blood through the liver is greatly retarded There occurs portal venous stagnation which is reflected backward to the abdominal viscera whose venous return is through this system

Many years ago Frenchs reported on the lesions of the liver cells which may be seen following portal venous obstruction Eppinger has called attention to the areas of fleterus necrosis" and others have observed areas of such size as to call them 'biliary infarcts While some writers have believed that human bile is incapable of producing permanent hepatic cell injury Rous and Larimore have stated that, "If this he true man differs from all other well studied animals' Figures 2 and a show a few of the changes in the cytol ogy of the liver which occur shortly after obstruction of the common bile duet

The portal circulation is not alone affected by the ductal occlusion but as the pent up

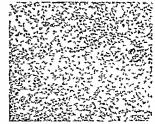


Fig 2 Photomicrograph showing areas of necrosis and dilated biliary radicals and areas of marked degeneration of hepatic cells X oo

bihary and ductal secretion accumulates the arterial circulation suffers in a lesser degree Nevertheless the combined effect is to provide a degree of hepatic anovemia which as Rich has shown causes histologic changes in the hepatic cells

The effect of portal cenous stasts on the cir culation Since the portal venous system drains a large part of the blood from the abdominal viscera, obstruction to it has additional effects. The stagnation of blood in the intestinal tract and other viscera leads to an increase in the blood volume in this part of the circulatory system and a decrease in the circulating blood volume. The degree to which this may occur is in part dependent on the efficiency of the collateral venous anastomosis

The bilious ascites that is so frequently observed in varying degrees following common duct obstruction is in part an expression of the rise in pressure in the capillaries. The circu lation time through the capillaries is increased and there may result an excessive reduction of the oxygen content of the blood in this region of the vascular system. The accompanying anovemia leads to an increased permeability of the capillary wall and causes an increased passage of fluid through it

Decompression While the obstruction of the common bile duct may in itself produce serious cytological changes in the liver and

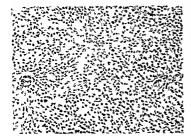


Fig. 3 Photomicrograph showing the dilated bihary capillanes and marked passive congestion resulting from common duct obstruction X 80

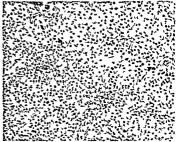
physiological changes in the portal venous circulation, it is equally true that the rapid release of the obstruction with the sudden inflow of blood into hepatic vessels whose circulation was in varying degrees impeded may lead to equally scrious consequences. The intense hyperemia which takes place when a complete ductal obstruction is suddenly released (Fig 4) may cause additional damage to the liver cells and changes in circulation.

The difference of opinion now expressed in the literature as to whether compression or decompression produces changes in the urnary tract may possibly be explained by the assumption that both processes produce of tologic and physiologic changes. Which one may cause the most marked alteration in function may in part be associated with the rapidity with which compression or decompression is accomplished.

Mont Reid, in discussing certain possible advantages of biliary decompression, stated

The effect of cysticocholedochostomy or some modification of it may afford a means of gradually releasing the bile pressure in the biliary apparatus

I have frequently observed that the drainage of common bile duct of deeply jaundiced patients is followed by a serious toxic state characterized by isitessness, normal or subnormal temperature, and a tendency to sleep I have not seen this towe state in non jaundiced patients, and it would seem, therefore, to be due not merely to the loss of bile, but rather to the effect of the release of the bile pressure. The same effects have been noted when deeply jaundiced patients were relieved of their bile.

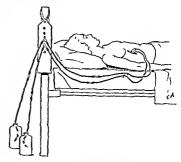


lig 4 Intense hyperemia and the extravation of blood into the biliary capillaries following the sudden release of complete common duct obstruction × 90

pressure by anastomosing the gall bladder to the stomach or intestine

In 1926, one of us (14) reported that he had used a method which provided for a type of gradual decompression and that he thought the matter should be further investigated. The problem, however, has received scant attention for some years we have used the following method of decompression infer the release of an obstructed common bile dust

Method As soon as the I-tube has been sutured in the common duct and bile begins to flow from it, it is clamped. When the



I ig 5 Diagram of decompression apparatus

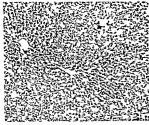


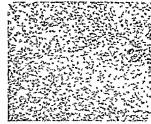
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Decompression While the obstruction of the common hile duct may in itself produce serious cytological changes in the liver and readily be determined by frequent observations of the patient's stools and repeated van den Bergh determinations In Figures 6, 7, 8, 9, and 10 are shown the variations in the bile drainage in a group of the patients on whom this apparatus has been used, when the level of the tube is moved up or down to maintain the conditions described above The various levels are indicated by the numbers 1 to 5, 1 representing level of common duct and 5 a point about 25 centimeters above this

Other advantages While the advantages of gradual decompression of a chronically distended biliary ductal system must be clear from the cytologic and physiologic point of view, there are additional advantages of no mean importance The forcing of bile into the duodenum, once the obstruction is relieved, which prevents the loss of bile to the exterior,

is of great value

It is only necessary that the pressure from the decompression apparatus be sufficient to overcome the tonus of the sphincter mechanism at the lower end of the common bile duct for the bile to flow freely into the duodenum

Formerly the method of simply allowing the bile to drain into a bottle hung at the side of the bcd exerted, if anything, a suction effect In many cases this resulted in the drainage of

large amounts of bile

The loss of fluid and electrolytes when the bile is thus drained to the exterior is considerable, but of even more importance is the loss of the intestinal functions of the bile

While the externally drained bile may be returned to the patient through a Jutte tube into the stomach, it is often impossible to administer all the bile drained externally by this method and the procedure is distasteful to the patient. In the method which we advocate the bile enters the duodenum by its normal route Appetite improves rapidly and "pancreatic asthenia" has not been observed during convalescence

SUMMARY

We have discussed the possible effects of obstruction of the common bile duct on the cytology of the liver cells and upon the portal blood flow The effects of a rapid

release of complete common bile duct occlusion has also been discussed and a method presented for slowly decompressing the system after release of the obstruction method suggested obviates the necessity of feeding the patient bile during the postoperative period and results, we believe, in a smoother convalescence

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THE DISRUPTION OF ABDOMINAL WOUNDS

A Report of 22 Cases

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COMPLICATION of abdominal surgery with which every surgeon is familiar is the disruption of wounds. That it is a serious accident is revealed by the mortality rate of 22 to 50 per cent, reported in a series of publications on the subject. This fact should stimulate surgeons to seek measures whereby such complications may be avoided.

The wisest attack upon the problem would seem to be a study of the incidence, ethology, and treatment of evisceration. That effort has been expended in this direction is indicated by a growing literature many papers having been written by surgeons with wide experience. However, it is difficult from these papers to obtain accurate information regarding the frequency of exisceration, for few

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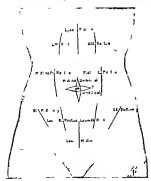


Fig 1 Location and designation of incisions employed.

authors state what percentage of their ab dominal wounds broke down. Accurate data, also, are hacking concerning the use of differ ent suture materials in large series of cases, and there are conflicting opinions regard ing etiology and treatment of disruption of wounds.

Several variable factors must be considered in regard to every abdominal wound such as the location of the incision, the suture mate rial used in closing, the operation performed, the levion whether malignant or non malignant and whether infection was present previous to operative procedure

For the purpose of making a comprehensive study of the problem of evisceration on the surgical service of the New York Hospital the records of all patients upon whom ab dominal operations were performed between september 1, 1932, and April 30, 1936, were reviewed with respect to the factors named It is believed that by this means all cases of disruption were brought to light and the full est possible data obtained on them A total of 2,927 records was reviewed and the data classified, 22 cases of evisceration were discosed—an incidence of 0.75 per cent. The results of the study are shown in a series of tables.

The literature on disruption of wounds will be referred to only in making comparisons Excellent reviews of the subject have been made by Jenkins and others

AVALISIS OF 2,927 ABDOMINAL OPERATIONS

In order to establish correct figures for the mendence of evisceration and for certain factors which may affect it, it obviously is necessary to know facts, not only concerning the cases of disruption, but concerning the series from which these cases were drawn. To obtain this information, a careful analysis of the 2,927 abdominal operations was undertaken

TABLE 1 -CENERAL INFORMATION

Number of abdominal operations	2,027
Total eviscerations	22
Incidence, per cent	0 75
Deaths	10
Mortality, per cent	45 45
*The ro deaths due to evisceration accounted for	or ø 34 per cent of t

It was found that record room files, operating room cards, and operative notes on each case had to be consulted to complete the study Table I shows the general information obtained

A table was compiled to show the influence upon the incidence of evisceration of the site of the incision (Fig. 1), and it includes figures regarding the suture material used in closing each type of wound (Table II)

Tables III A and B approach the subject from a different viewpoint. Here the figures are given for incidence of evisceration in various operations and again reference is made to the suture material employed.

It will be noted that catgut was used in closing 1,608 wounds, silk sutures in 1,144, and silver wire in 175 cases. For the sake of clarity, a hrief description of the suture materials and methods and the terminology ap

I CATGUT CLOSURE

a Interrupted caigut closure. The peritoneum is closed with a continuous suture of Zero plan or No 120 day chromic catgut. The fascia is approximated by a series of interrupted sutures of chromic catgut No 1 Stay sutures of silkworm or "Dermo" are placed so that they embrace the fascia only.

b Interrupted catgui closure u ith figure of 8 sutures. This is a modification of a, instead of interrupted chromic sutures, the figure of 8 type of suture with

No 1 20 day chromic is employed

plied to them will here be given

c Interrupted caigut closure with drainage No 1 20 day chromic catgut is used to close the pentioneum Instead of one continuous suture, one continuous suture starts from each extremity of the wound and is hrought to the point where the drain emerges At this point on either side of the drain, a single reinforcing suture of the same material is placed. The single suture is referred to as a "safety suture." The fascia is closed in the manner de scribed and stay sutures complete the closure

II SILK CLOSURE

a Silk closure without drainage. A continuous suture of twisted surgical silk No 7 approximates the peritoneum and interrupted sutures of the same

TABLE II —SITE OF INCISION, SUTURE MATERIAL

Incision	Cat gut	Silk	Silver	Total	Fv18 cerations	Per cent
Upper right rectus	630	287	120	3 037	13	1 21
Upper left rectus	42	46	17	105	2	1 90
Lower right rectus	370	60	14	362	2	0 55
Lower left rectus	84	24	11	110	2	1 63
McBurney right	488	600	1	1 008	1	0 00
McBurpey left	6	<u> </u>		6		
Upper midline	1	16	,	18	0	
Lower midline	41	20	5	76	0	
Mid midline	4	35		30	0	
Mid right rectus	16	14	5	35	0	
Mid left rectus	5	,	1	7	1	14 00
Paracostal	,	2		11	0	
Transverse rectus	1	0		1	1	100 00
Transverse umbilical	1	12		13	•	
Totals	1 608	1 144	175	2 027	22	0 75

TABLE HI A -OPERATION, SUTURE MATERIAL

Operation	Cat gut	Silk	Silver	Total	I vis cerations	Per cent
Appendectomy	678	626	6	1 103	I	0 07
Biliary tract operations	414	231	51	597	8	I 34
Stomach operations	158	75	63	306	4	1 30
Small bowel operations	\$0	14	7.4	78	7	1 28
Large bowel operations	123	81	21	275	5	2 22
Pelvic operations	113	29	2	144		•
Exploratory laparotomy	20	20	4	44	1	2 27
Central bernis repair	2.4	128	ı	153	2	I 31
Splenectomy	7	23	2	32	0	۰
Virscellaneous	18	17	10	45	0	0
Total	1 608	1 144	175	2 927	22	075

TABLE III B - SUTURE MATERIAL, SUMMARY

Suture material	Total	Eviscera tions	Per cent
Catgut	r 608	11	0.62
Silk	I 144	7	23.0
Silver wire	175	3	

*One disrupted wound was closed with through and through a "kw rn

material unite the fascia. When stay sutures are employed they are of the same silk and form a literal figure of 8, including the fascia. The subcutare my tissues and skin are closed with interrupted silk (No 5) sutures b Sith closure with drainage. This closure is the same as b above except that silk, No 7, is used in place of catigut. The safety sutures of silk are employed. Stay sutures may or may not be used, as the subcutaneous tissues are not approximated unless they are the subcutaneous subcutaneous subcutaneous subcutaneous subcutaneous subcutaneous approximation and reaction around the drain is less likely to persist in the surrounding tissues if sutures are omitted.

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III SILVER WIRE CLOSURE

Through and through siter user dozure. A suture of silver wire is introduced from the slin through the subcutaneous its sues and fasca down to and through the pertinenum and is then returned to the silver the strength of the silver with the strength of the silver with the silver through the silver with the silver wit

It may be said that considerable latitude is granted the members of the surgical service of the New York Hospital in the selection of suture material and slight modifications in procedure also are noted It is the opinion of the authors that, to prevent evisceration, the safest closure is the through and through silver wire method developed and popularized by I rench surgeons and more recently de scribed by Reid et al In this series 175 abdominal wounds were closed in this man ner Without exception these were cases in which it was felt that disruption was most likely to occur, i.e. in individuals with massive abdominal infections, with extremely obese abdominal walls, with poor musculature, or else in debilitated patients suffering from mulignant disease. In the analysis of cases, three disruptions are credited to silver wire closure, but in none of these was the method at fault. In one the wire broke because it was of smaller caliber than usually employed, hence, the evisceration was due to material rather than procedure. The wires in another patient were not twisted enough to resist the pressure exerted by a muscular abdomen under tension. In a third case all wires were removed at one time which is contrary to the prescribed procedure

In the group of disrupted wounds, the secondary closure was accomplished with silver wire in all but 4 cases. It is worthy of note that not one of the secondary closures broke down, a further evidence of the efficiency of this method of closing. It is recommended, therefore, that silver wire closure be used in the presence of massive abdominal infection, in wounds which have been grossly contaminated by gastro intestinal contents, and in all patients debilitated by malignancy or long standing chronic disease associated with anemia. In other types of cases silver wire closure is not indicated nor is this method of closure required.

There are definite rules and requirements which must be met in the use of silver wire (r) The several layers of the abdomen must be carefully approximated to avoid massive scar formation, which may be a potential factor in postoperative weakness of the abdomi nal wall (2) The wires must be placed with meticulous care to prevent the inclusion of a segment of intestine or omentum in the con cealed loop of silver wire as it is drawn tight Reid et al report 334 cases closed with through and through silver wire without a disruption, but they cite several instances in which a loop of bowel or omentum protruded between two wire sutures Such instances in our series have been included in the eviscera tions (3) Gauge 20 round silver wire should be used It has been found that this size wire, as furnished by a number of manufacturers. possesses sufficient tensile strength to main tain any abdominal wound in proper approvimation, provided the sutures are placed not more than a centimeters apart. Wire of smaller caliber, though it may be equally strong, bas a greater tendency to cut through the edges of the wound (4) Guards between the silver wires and the skin are not employed, for it has been found that a greater degree of necrosis results when such protective agents are used (5) The sutures should be removed one a day after the fourteenth or fifteenth days (6) Before removal, the silver wire and skin should be disinfected, for it is obvious that otherwise infection might be carried by them into the peritoneal cavity (7) Continuous buried metallic sutures are not advocated in abdominal closures, for reaction to a foreign body over a long period of time may lead to abscess formation

One definite disadvantage in the use of silver wire in closure, is in connection with drainage, for, on account of its bulk, it diminishes the space through which the wound is drained

In a closer study of these abdominal operations in regard to evisceration, little difference will be noted in the results of silk and catgut closures However, it is the opinion of the authors that if silk were used with proper discrimination, the results with it would be better than those with catgut The suitable cases for silk sutures are without gross infection. In the presence of infection, a catgut elosure is preferable. It is employed in the majority of abdominal closures here as elsewhere in this country Though the authors have no positive convictions concerning the comparative value of silk and catgut, they are convinced that both should never be used in the same wound When used alone in a clean wound there is no reaction around silk sutures Some reaction takes place as catgut sutures are absorbed The eyudation of white cells and serum around the catgut sutures may invade the region of the silk sutures, which then become foreign bodies A "sterile abseess" may result and there is induration and tenderness until the silk suture is east out of the wound The injudicious use of these two suture materials in the same wound has cast discredit upon silk sutures

Table IV shows the effect on the incidence of evisceration of malignancy. It also indicates the seriousness of this accident in malignant cases, for the mortality will be seen to be more than twice as high after operations for malignant conditions than for non-malignant conditions.

Certain facts are revealed by a study of the four tables thus far presented. In Table II it will be seen that mid left rectus and transverse rectus incisions are rightfully used with great reserve, for the incidence of evisceration.

TABLE IV -EVISCERATION IN MALIGNANCY

	Malignant disease	Non malignas disease
Total cases Eviscerations	582	2 345 16
Incidence, per cent Mortality from eviscerations,	1 20	0 67
per cent	83 33	31 25

in both is very high. Of the usual incisions in the upper abdomen, the upper left rectus carnes the highest percentage of disruptions in this series. Only one McBurney wound disrupted, in this case the closure was inadequate and the drains were of such bulk as to prevent the wound from closing. The high incidence of evisceration noted under "Litrge bowel" in Table III may be accounted for by the fact that many erises of carcinoma were included under this heading (198 out of 225). That mahgnancy very seriously affects the incidence and results of evisceration is shown in Table IV.

The data which have been tabulated and discussed so far have to do with evisceration in its relationship to the total number of abdominal operations Table V concerns the eases of disruption Each item in the table will be discussed briefly

Unlike many reports on the subject of eviscerations, this report is marked by a preponderance of male patients (or per cent) Meleney and Howes report 70 per cent, Colp 54 per cent, and Macs 40 per cent males in their series Although the exact figure is not available, men and women were about equally represented in the total abdominal operations.

The majority of patients whose wounds disrupted were between 40 and 60 years old The youngest patient was 4 and the oldest 72 years of age

Malignancy has been emphasized as a predisposing factor by many authors, that it acts in this capacity is demonstrated well in our series of cases. There were 6 exiscerations in patients operated upon for malignant disease, they comprised 27 per cent of the total eviscerations. In 582 laparotomies for malignancy, there were 6 exiscerations (1 20 per cent), in 2,345 operations for non-malignant diseases there were 16 exiscerations (0 67 per cent). Thus in this series, exisceration occurred twice as often in malignant diseases.

Of the 16 eviscerations in the non-malignant cases 6 followed cholecystectomies, 3 for acute and 3 for chronic cholecystitis. The 10 other eviscerations were associated with operations for the following conditions peptic

SURGERY GYNECOLOGY AND OBSTETRICS

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TABLE V Chairs of Control of Control	Operation	Mikulicz Heum	Repair of vertral	Cholecystectority	o Porterior gastru- enterustomy	Gastric resection purtial	o Trplorati ya carel n yana a becesa
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	25.56	9 × 3	, F2.	La	2 22	2002	i Šzz

ulcer, 3, postoperative hernia, 2, ulcerative cohtis, 1, diverticulosis of the colon, 1, bleeding from the gastro-intestinal tract, i, appendicitis with peritonitis, 1, and pancreatitis, 1

Operations for malignant diseases and for disturbances of the biliary tract together were responsible for 12 eviscerations, 54 5 per cent of the total number

Debility long has been recognized as a possible cause of evisceration. It was present as evidenced by loss of weight, anemia etc., in II of the 22 cases As one might expect, it was confined largely to the patients with carcinoma, bleeding ulcer, or chronic debilitating diseases such as ulcerative colitis. The red blood cell counts ranged from 25 to 59 million and the hemoglobin from 40 to 108 per cent In all but one of the patients classified as debilitated, the hemoglobin was below 80 per cent, while in all save one of the others it was above 80 per cent. However, these figures for hemoglobin fail to give a true index, for they represented the last count obtained before operation, after every means of raising the hemoglobin by transfusions etc. had been exhausted

Although the blood pressure was slightly elevated in a few of the cases and definite arterioselerosis was noted in 8, both were in keeping with the average for this age group

This series of cases is remarkable because in no instance was jaundice or diabetes associated with the evisceration although these conditions have been encountered frequently in the surgical cases in this clinic

There was one patient with a history of syphilis and a 4+ Wasserman reaction In 2 others the serology was questionable. Aside from these, lues played no part

It will be seen in Table V that evisceration occurred 13 times in upper right rectus incisions, twice in upper left rectus incisions. once in a transverse rectus incision, once in a mid left rectus, once in a McBurney, twice in lower left rectus, twice in lower right rectus incisions. It is interesting to note that the single transverse rectus incision disrupted 7 days after operation

An attempt has been made to discover a connection between evisceration and the type of suture material used. Of the 22 existerations II were in wounds closed with catgut. 7, with silk, 3, with through and through silver wire, and I, with through and through silkworm gut

Drains were used in 8 cases, 5 of which were gall bladder operations, I an appendix, I a carcinoma of the large howel with abscess, and I a central hernia. The 14 remaining

were closed without drainage The disruption occurred from 1 to 16 days after operation, the majority on the fifth to

eleventh days after operation

Occupying prominent positions among contributing factors were vomiting, 8, coughing, 6. distention, 5, and lack of co-operation, 2 It is well known that patients with storms postoperative courses complicated by disten tion and somiting necessitating gastric lavage, and by bronchitis with cough, are more likely to eviscerate At the same time we find eviscerations among patients who presented none of these postoperative complications

Secondary closures were effected in 18 of 22 cases with through and through silver wire sutures None of these reopened In 2 cases the wounds were packed and strapped with adhesive, in the 2 remaining the wounds were resutured

Following secondary closure the patients remained in the hospital from 10 to 26 days

The immediate mortality in this group of cases was 10 in 22 cases, or 45 45 per cent This death rate corresponds closely to figures reported by other authors. White records 16 denths in 30 cases Meleney and Howes, 22 deaths in 50 cases (22 per cent and 44 per cent, respectively) Of the 22 cases suffering dis ruption 40 g per cent died within 7 days of the secondary closure Four died within 24 hours, I on the second day I on the third day, and 2 on the fifth postoperative days One death occurred 7 days after the secondary closure Without exception the evisceration was definitely the cause of the immediate death. The majority of the patients although failing to make the usual progress after operation, showed no definite failing until the wound

gave way From that time on their course was invariably unfavorable

A follow-up of the cases discharged from the bospital after the secondary closure. showed that I died 8 months later of cirrhosis of the liver and another 22 days later as the result of cancer There are 2 patients with definite postoperative hernias occurring 11 and 18 months respectively after operation, whereas 6 are not found to have hermas on revisits to days to 2 years after discharge from the hospital

CONCLUSIONS

It cannot he said that very definite conclusions have been reached by this study in regard to the problem of evisceration. In all probability, the solution of the problem rests not in any one factor but in a number of different ones It is suggested by the review of cases that closure of the abdomen should be accomplished by means of silver wire throughand through sutures in a larger number of suitable cases When malignancy is associated with infection, as in the resection of any portion of the gastro intestinal canal. silver wire would seem to be the suture material of choice

All wounds which are grossly infected and in which silver wire closure is not indicated, should be closed with catgut Silk sutures should be used in clean wounds only

Silk and catgut should not he used in the same wound

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ANALGESIA, ANESTHESIA AND THE NEWBORN INFANT

STEWART H CLIFFORD, M D, and FREDERICK C IRVING, M D, F A C S, Boston, Massachusetts

RESENT methods of obstetrical analgesia are not ideal in their effects upon the mother (2), and none is without some unfavorable influence upon the fetus Although these methods are not perfect, certain of them do give as high as 84 per eent complete maternal amnesia. The ultimate fate of present methods of analgesia may well hinge on the price the infant must pay for the mother's comfort Modern obstetrical analgesia is accomplished by the skilful blending of various agents-thus pentobarbital, scopolamine, rectal ether and nitrous oxide-oxygen-ether may all be combined during one method of analgesia The present study is a critical analysis of the influence of the various combined methods of analgesia and of their component parts upon the condition of the infant at birth

A multitude of factors contribute to the condition in which the infant is found at birth (Chart 1) That the influence of analgesia or anesthesia may be determined, as many as possible of the other complicating influences must necessarily be eliminated or controlled To this end the effect of various methods of analgesia has been observed in comparable groups (Table I) of normally delivered, full term, vertex presentation infants. All cases of operative delivery, breech extraction, internal podalic version, premature separation of the placenta, placenta prævia or congenital abnormality of the fetus have been excluded from this investigation. With the exception of the control group that received no medication of any kind, every case received nitrous oxide-oxygen, with or without less than an ounce of ether, for an average of 30 minutes and one of the basic analgesics

Thus is the eighth in a series of studies of the newborn infant death rate from the Bosbon Lyng in Hospital the Department of Obstetrics and Pediatrics of the Harvard Medical School and the Department of Child Hygene of the Harvard School of Public Health This study was made possible through the generosity of Mrs. Albert C Burrage PHYSIOLOGY

The normal physiology of the felix and the newborn The effect of analgesia and anesthesia upon the fetus and the newborn must be expressed in terms of the observed variation from the expected normal behavior. This being the ease, the normal physiology of the fetus and the newborn is reviewed briefly so that the findings of this study may be more intelligible.

The animal and, we believe, the human fetus make rhythmical respiratory movements in utero (7). When the fetus is removed from the fluid medium the established respiratory rate continues and the animal "breathes and develops quite normally" (5). This conception is quite different from the belief previously held that the respiratory mechanism lies dormant in utero and at birth some physical or chemical stimulus is required to initiate the first respiration.

The full term human fetus in ulero exists normally in a state of cyanosis with a mean eapillary oxygen unsaturation of 111 volumes per eent (3) (the threshold for visible eyanosis being at 65 volumes per eent). The normal fetus at birth, due to impairment of placental circulation by the retracting uterus, is in an even greater state of cyanosis with a capillary unsaturation of 139 volumes per cent. At birth the arterial blood of the fetus contains less oxygen than the blood in the maternal arm yein.

The normal fetus, therefore, exists *in utero* with a low oxygen content in its blood and in a constant state of eyanosis. This cyanosis becomes most marked at the moment of birth. Cyanosis must be considered the normal state for the infant at delivery and becomes pathological only if unduly prolonged. The normal fetus makes rhythmical respiratory movements in utero and, coincident with the termination of placental circulation at birth, we expect the normal infant to continue

Pant pon

Morphine

Rectal ther 23 200 200 2 6 26

Mag sul



Chart r Factors influencing the condition of the infant at birth

this respiratory rhythm spontaneously as extra uterine breathing. In the present study an infant who fulfills the requirements of this paragraph is placed under the classification of "physiologically normal at the time of deliven".

The abnormal physiology of the fetus and the newborn Intra uterine anovemia of the buman fetus whatever its cause, is accompanied by an accumulation of lactic acid in the fetal blood proportional to the degree of anovemia (4) In extreme cases the amount of lactic acid accumulated may reach a point moom patible with life In less severe degrees of anovemia the respiratory rhythm of animal fetuses first become slowed and the heart rate is accelerated. In the presence of a

marked degree of anovema respirations stop, "the blood pressure slowly declines through 40 to 60 seconds It then may show a slight increase, but finally falls rapidly through two to three minutes, then more slowly for one or two minutes until a systolic pressure of 15 to 20 millimeters mercury is reached Concomi tant with the drop in blood pressure the skin becomes blanched and cold, as in a shock If the fetuses are delivered at term under

these circumstances, the onset of respiration either fails or is much delayed " (6) Physical injury to the fetus, either through

cerebral edema or hemorrhage, may affect the central nervous system centers directly and result in a clinical picture at birth much the same as that which is found in intra uterine anovenua.

Certain drugs, such as ether, morphine,

Certain drugs, such as ether, morphine, quinne, and the barbiturates, when administered in doses of sufficient amount to the pregnant animal will retard and at times arrest the respiratory movements of the fetus in unito (7).

The effect of abnormal factors may be evidenced by the death of the fetus in interior at the time of delivery, by more or less difficulty in establishing the infant's extra uterine breathing and by an unusual prolongation of the evanotic state of the new born They may be evidenced by a pallid state at the time of birth and by the absence of muscular tone

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TABLE I \ert Sacmal Furst Runtured Scopola Rectal Gaz Primary Second ry pr sen deliver Parity embrane medica Eth tage tat o to buth xvzen med c tion ics tion AV CA AY PIE 30 YE av hrs AV ETS N ne None 100 100 s 10 0 • ۸ Pent harbital > oulamine 40 100 100 1 6 27 10 0 7 6 7 1 1/81 0 7 Pentobachital Rectal ether 100 100 26 0 0 . 2 4 13 5 7 0 2 7 27 0 3 Pentob rhital Sc pol m Rect I th 18 8 1 1/118 0.8 I 7 . . 30 Pent barb tal far hi hy t 50 9 00 2 4 27 2 6 a 28 06 5 jul mine Sodium amyt 1 c 100 100 a 5 28 .. 0 7 6 TT 2 1/50 26 08 bodium amytal Rect | ther 100 100 2 4 23 0 6 4 E2 3 2 8 0 24 1 1 Peru cton 100 100 . . 0 3 Pa topon c relamine a 3 50 100 100 27 75 0.7 1/3 1/43 10 27

THE EFFECT OF OBSTETRICAL ANALGESIA OR
ANESTHESIA UPON THE LIFE OF THE FETUS

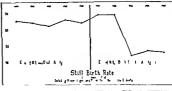
AND NEWBORN

Obstetrical analgesia or anesthesia by means of a combination of pentobarbital or sodium amytal with terminal nitrous oxide-oxygen or nitrous oxide-oxygen-ether inhalation has been used with increasing frequency at the Boston Lying-in Hospital since 1931. Up to 1933 sodium amytal was in use but since this time practically every routine hospital delivery has received pentobarbital with or without scopolamine or rectal ether.

With this extensive use of the barbiturates, any fatal effect of the drug would have to be reflected in an increased stillbirth and neonatal These rates for a 5-year mortality rate period preceding and for a like period following the introduction of barbiturate analgesia in 1931 are given in Chart 2 The stillbirth rate has fallen from 65 in the prebarbiturate era to 56 per 1000 births for the past 5 years The neonatal mortality rate was 22 for the period prior to 1931 and 19 per 1000 births for the 5 years following 1 It would appear from these figures that the general use of sodium amytal and pentobarbital in this clinic has had no ill effect on the life of either the fetus or the newborn infant

In contrast to the statement just made, we issue a warning against the use of any analgesic containing an opium derivative. The only 2 deaths encountered in the 410 cases comprising this study occurred in the 75 receiving pantopon. Evidence that is to follow will demonstrate the alarming symptoms that have followed the use of morphine or pantopon. In a previous communication (1) it was

1 May 25 1937 The neonstal mortality for the year 1936 was 13 per



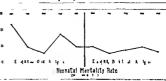


Chart 2

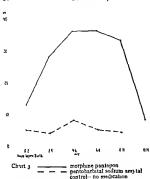
shown that the use of morphine within 4 hours of the birth of a premature infant was associated with a doubling of the death rate. It was also demonstrated that the larger the dose of the drug the higher was the associated mortality. In view of these facts one can but assume that the use of this type of analgesia on a large scale would result in an increase in the stillbirth rate and as well the neonatal mortality rate.

MORPHINE AND PANTOPON VERSUS SODIUM AMYTAL AND PENTOBARBITAL—TABLE II

A Their relative efficiency as maternal analgesics and their effect upon the normal physiology of the newborn. Of the mothers receiving sodium amytal or pentobarbital as a basic analgesia 78 per cent had absolutely no memory of their labor compared with 34 per cent of those receiving morphine or pantopon

TABLE II

	No anesthesia	Pentobarbital sodium amytal	Morphine pantopon
Cases	53	260	100
Type of labor Easy—per cent Moderately easy—per cent Moderately hard—per cent Hard—per cent		78 23 5 4	34 24 24 24 18
Condition of infant at birth Physiologically normal—per cent Active resuscitation required—per cent Abnormal cyanosis—per cent	73 0 23	63 3 23	43 23



In the pentobarbital sodium amytal group, 63 per cent of the infants were physiologically normal at birth as opposed to 43 per cent of the morphine pantopon series

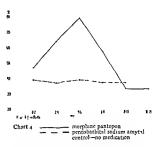
An active method of resuscitation, such as tubbing, mouth to mouth, or the use of a respirator, was required for 3 per cent of the birbiturite group and for 23 per cent of the morphine pantopon cases

Abnormally prolonged cyanosis was present in 23 per cent of those receiving barbiturates and in 35 per cent of those given an opiate

I wo infant deaths occurred in the pantopon series and none in the barbiturate

B The relation between the time internal from medication to birth and the condition of the infant at delt ery (Chart.) In an effort to detect the slightest effect of medication upon the fetus every case in which extra utrine respiration did not begin spontaneously and independently at birth his been classified as physiologically abnormal. This definition has been so rigidly applied that resuscitation by such simple means as suction and spanking has been sufficient to evolude the infant from the normal group.

In the case of morphine and pantopon a



val from medication to birth and the number of physiologically abnormal infants at delivery (Chart 3) Medication given to the mother less than 2 hours before birth is associated with some degree of abnormality in 47 per cent of the infants. This latter figure increases to a peak of 70 per cent abnormality in the group receiving medication 4 to 6 hours prior to the time of birth and then falls to 33 per cent when the time interval becomes 8 hours or more

This relationship does not exist in the case of sodium amytal or pentobarbital medication (Chart 3). The rate of physiologically abnormal infants is fixed between 37 and 39 per cent whether the drug is given 2 or 10 hours before actual birth.

The more usual method of appraising the effect of maternal medication upon the fetus is to record the number of infants requiring active and vigorous methods of resuscitation (Chart 4) Again a definite relation is found to exist between the time of medication with morphine or pantopon and the number of infants requiring resuscitation by methods of artificial respiration Thirteen per cent of infants whose mothers received morphine or pantopon within 2 hours of their birth required artificial respiration. Thirty six per cent required active resuscitation when the drug was given 4 to 8 hours before delivery and 8 per cent when medication was 10 hours or more before birth

Again it should be emphasized that no relation between the time of medication and the incidence of cases requiring artificial resuscitation could be demonstrated in the case of analgesia with the barbiturates

C The relation between the size of the dose and the condition of the infant at birth The relation between the size of the dose of morphine or pantopon and the condition of the infant at birth cannot be determined from the present study since each patient received the same dose, 1/2 grain of pantopon or 1/4 grain of morphine sulphate, and in no case was the dose repeated From an earlier study it was found that the premature infants of mothers receiving morphine within 4 hours of delivery encountered twice the death rate of infants whose mothers had not received the drug (1) It was also shown that the death rate increased as the size of the maternal dose increased

The average pentobarbital medication in the present study was 7 5 grains Of the group receiving 6 grains or less, 40 per cent of the infants were considered physiologically abnormal compared with 30 per cent of the group receiving o grains or more

The average sodium amytal dosage was 121/2 grains Of the group receiving o grains or less 36 per cent were thought to show some variation from the normal whereas in the series receiving 15 grains or more 32 per cent failed to breathe spontaneously the moment delivered

A definite relation is thought to exist between the size of the dose of morphine administered and the condition of the infant at birth, but no relation is demonstrable be-

TABLE III -COMPARISON OF MORPHINE-PANTOPON AND BARBITURATE ANESTHESIA

7	forphine pantopon	Barbitura
Complete maternal amnesia	34%	78%
Deaths in this series	2	0
Artificial resuscitation required	birth 43%	63%
Infants physiologically normal at	birth 43%	63%
Does a definite relation exist bet	ween	•
time of medication and condit	ion of	
infant ³	Yes	Мо
Does a definite relation exist bei	ween	
size of dose and condition of in	fant? Les	No

tween the size of the barbiturate dose and the state of the newborn

A review of the case of morphine-pantopon barbiturate basic analgesia recalls the points as given in Table III

In the light of these facts the use of morphine or pantopon as a method of obstetrical analgesia would appear to be not only unsatisfactory for the mother but dangerous to the infant.

THE COMBINATION OF SCOPOLAMINE, RECTAL ETHER OR PARALDEHYDE WITH THE BAR-BITURATES

The effect of combining scopolamine, rectal ether, or paraldehyde with the basic pentobarbital or sodium amytal analgesia has been analyzed in Table IV When scopolamine is combined with either pentobarbital or sodium amy tal a more successful obstetrical analgesia results in so far as complete maternal amnesia is concerned. The addition of this drug has not resulted in any significant change in the condition of the infants at birth However. the combination of rectal ether or paraldehyde with the basic analgesia cannot be demonstrated to evert an unfavorable influence upon

TABLE IV								
	Secondary analgesia	Vaternal smnessa %	Infant					
Basic analgesia			Normal at birth %	Artificially resuscitated %	Abnormally cyanotic %	Minutes to first breath	Minutes to first cry	
None (Control series)	None		73	۰	23	ı	1	
Pentobarbital	Scopolamine Rectal ether Scopolamine	90 78	62 55	2 2	6 22	0 8 0 8	40	
	rectal ether Paraldehyde	83 60	69 64	3	15 24	88	3 0 4 0	
Sodium amytal	Scopolamine Rectal ether	82 72	58 70	8	26 26	8 0	3 0	
Pernocton	None	44	66	6	40	0 7	5.4	

the condition of the infant at birth, such addition does not result in a more successful maternal analysisa

PERNOCTON ANALGESIA

Pernocton (Table IV) was used intravenously in 50 cases but did not produce as successful maternal amnesia as did pentobarbital or sodium amytal. The infants under this medication reacted about the same as those under the oral barbiturates with the exception that more abnormal cyanosis was encountered.

THE EFFECT OF NITROUS OVIDE AND ETHER UPON THE NEWBORN INFANT

In this study every case, except the controls, received nitrous oxide and oxygen during the second stage of labor (Table I)—the average length of administration being 30 minutes Of the patients receiving gas oxygen for 30 min utes, 63 per cent of the infants breathed spon taneously on delivery, the series receiving gas ovvgen from 30 to 60 minutes had 62 per cent normal infants while those from 60 to 120 minutes are recorded as having 63 per cent infants unaffected In other words, the length of admin istration of nitrous oxide analgesia seems to bear no relation to the condition in which the infant is found at birth Unfortunately, the concentrations of nitrous oxide and oxygen administered to the individual have not been recorded and the relation of this important factor to the infant's condition cannot be given from our material. The conclusions of Fastman (6) on this subject are important "Nitrous oxide mixtures, administered to mothers in proportions of 85 15 or weaker, and for periods of less than 5 minutes, regu larly cause moderate degrees of fetal anoxemia but the normal, full term infant is apparently not harmed. When nitrous oxide oxygen is given in concentrations of 90 10 or stronger over periods which exceed 5 minutes, marked degrees of fetal anoxemia are produced in about one baby out of three and occasionally profound asphyvia neonatorum results "

The average patient in our study received less than 1 ounce of other combined with the nitrous oxide oxygen mixture (Table I) One hundred and two patients received no ether and 57 per cent of their infants were classified as physiologically, normal at birth One hundred and eighty three received ether mixed with gas-oxygen and 66 per cent of their infants were entirely normal at birth This small amount of ether certainly exerted no harmful effect on the fetus

ANALGI SIA VERSUS NO ANALGESIA

Since we believe analgesia containing an opium derivative should not be used the basic question resolves itself into barbiturate analgesia versus no analgesia. We have found little to choose between sodium amytal and pentobarbital but since the latter seems to be safer for the mother and to have slightly less effect on the baby it is the one in general use in our clinic. The comparison, therefore, is to be between delivery without analgesia and delivery under the combination of pentobarbital scopolamine rectal either nitrous orde ovygen either. The effects of these two systems, in so far as statistics can give them, are compared in Table V

TABLE V		
		Pentobarbital acopolamine sectal ether
		nitrous oxida oxygen
	ho analges a	ana gasta
Maternal amne 14	0	8400
Fetal mortality	۰	
Veonatal mortality	ò	ō
Infants physiologically normal	73°0	6 °0
Infants artifically resuscitated		20.
Infants abnormally cyanotic	230%	2190
Minutes to first breath	10	10
Minutes to first cry	I 6	4.7

What is indicated but not brought out already in this statistical comparison is the clinical fact that the analgesia baby is a dopey or sleepy baby It is true that they usually gasp shortly after delivery but the respirations are shallow and frequently after the first breath a considerable period may elapse before normal respiration is established. Their muscles are relaxed and they are limp, as the Table V shows, an average of 5 minutes passes hefore they cry An average of 2 per cent requires some method of artificial resuscitation before respiration becomes normal As has heen demonstrated by the fall in the stillbirth and neonatal mortality rates these symptoms.

while annoying or even alarming at times, are not serious-they are the price paid for analgesia If analgesia is used, they must be expected, understood, and treated

DISCUSSION OF THE FACTOR IN ANALGESIA RESPONSIBLE FOR THE SAMPTOMS OB-SERVED IN THE NEWBORN

A Pentobarbital or sodium amital have been able to demonstrate no relationship between either the size of the dose or the time of administration of the barbiturates and the condition of the infant at birth

B Scopolarine, rectol ether or paroldehyde We have been unable to prove an effect on the infants attributable to the doses used of scopolamine, rectal ether or paraldehyde

C Inholation ether The average patient baying received less than I ounce of ether inhalation it is perhaps understandable that we have been able to show no effect on the infant

D Nitrous oxide-oxygen There was no relation found between the duration of gas oxygen administration and the infant's condition

As bas been previously stated the factor about which we have had no information is the concentration of the nitrous oxide-oxygen mixture used Eastman's demonstration that high concentrations of nitrous oxide will produce severe anovemia of the fetus emphasizes the importance of this factor. He advises a mixture no greater than 85 15 even in operative obstetrics and the addition of ether to this mixture if necessary With attention thus called to the marked influences on the fetus of high concentration of nitrous oxide, future experiences with analgesia may be more successful than that here recorded

SUMMARY

Oprum derivatives administered during labor have been found to exert an unfavorable influence upon the condition of the newborn infant proportional to the amount given and

to the time interval between the administration of the dring and the birth of the child In this group 57 per cent of the infants reoured some stimulation before they would breathe and cry normally and 23 per cent were asphy trated to the point of requiring artificial Successful maternal annesia resuscitation was obtained in but 31 per cent of the cases

The barbiturates have had no harmful effect upon either the life of the fetus or upon the life of the newborn infant. Over 10,000 mothers have received sodium amytal or pentobarbital in the past 5 years, and during this interval both the still birth and the newborn infant death rates have fallen below the level of the preceding 5 years analgesia through a combination of barbiturate, scopolamine, rectal ether, nitrous oxide-oxygen and small amounts of ether 37 per cent of the infants required some stimulation before normal respirations were established while 31 per cent were sufficiently asphy viated to require artificial resuscitation Complete amnesia was obtained for 78 per cent of the mothers in this group

Neither pentobarbital, sodium amytal, scopolamine, rectal other nor paraldehyde could be held responsible for the symptoms of asphyvia that were encountered in some of the newborn infants. It is our belief that the untoward effects of analgesia may well be explained by nitrous oxide-oxygen mixtures above the 85 15 level producing a degree of fetal asphyvia dependent upon the duration of the exposure and the size of the infant

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PSEUDOMENSTRUATION IN THE HUMAN FEMALE

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HE conception that normal menstruation is the result of rbythmic dismantling of an estrin primed and progestin-modified endometrium has not changed since the recognition of a correlation between the ovarian and endometrial cycles by Robert Schroeder (25) in 1973. Our newer knowledge of the pby siology of menstruation has merely established the biochem ical nature of the two ovarian bormones, estrin and progestin, which successively actuate the endometrium in preparation for indation of the fertilized ovum

The immediate cause of the dismantling process of menstruation upon failure of fertili zation is still conjectural According to Allen, a decrease in estrin production resulting from the cyclic regression of the corpus luteum is the chief exciting factor of menstrual bleeding This theory is strongly supported by the recent experimental observations of Smith on the effect of 10 daily injections of from 400 to 500 rat units of estrogenic substance in hy pophysectomized rhesus monkeys Uterine bleeding, indistinguishable from the normal anovular type, appeared in 8 of 10 test animals after withdrawal of the treatment Two additional hypophysectomized animals, similarly treated with estrogenic substance and then given a rabbit units of progestin daily for a period of 10 days, menstruated from a progestational endometrium a days following the last injection. Since pituitary ablation invariably results in total suppression of ovarian function, Smith's recent work seems to indicate that withdrawal of estrin in fluence is the exciting if not the sole cause of menstrual bleeding and that the bormone, whether derived from the graafian follide or corpus luteum, supplies the essential mechanism of the non-secretory type of menstruation

The abdity of progestin to delay the onset of menstruation in normal and estrin treated castrated rhesus monkeys (8) does not necessarily imply that the absence of the bormone, when the corpus luteum regresses, is the excit ing cause of menstrial bleeding—no more than the ability of progestin to inhibit uterine mothlity (9) implies that the latter is caused by an absence of the hormone. Uterine motility, like uterine bleeding, is totally independant of progestin in its active phase.

In the human female, the individual and combined effects of the two ovarian hormones were amply demonstrated by Kaufmann, Clauberg, and others through the successive administration of estrogenic substance and progestin in castrated women. Estrin rehulds the dismantied endometrium following men struation, progestin modifies the estrin primed endometrium in anticipation of fertilization. In the absence of extreme uterine atrophy, uterine bleeding, clinically indistinguishable from normal menstruation, follows estrin

treatment of castrated and menopausal women

Concerning the possible occurrence of rhythmic uterine bleeding, clinically indistinguishable from the normal, from an endo metrum totally lacking the secretory (progestin) phase, Schroeder (27) states "There is a pecuhar, seasonal phenomenon in apes (non ovulator, bleeding of Hartman) which has not yet been described in humans unless one accepts the cases recently reported by Mazer and Zistiman The report is not chnically convincing (lacks adequate description of the bleeding) However, a certain amount of evidence suggests that this may occur in buman beings" Recognizing the justice of Schroeder's criticism, we have in cluded in this study details unavoidably eliminated in the previous publication (20)

TERMINOLOGY PSEUDOMENSTRUATION
VERSUS ANOVULAR MENSTRUATION

The somewhat acrimonious debate between English and American gynecologists concern

From the D-partment of Gynecology Mt. Sinai Hospital Philadelphia, Pennsylvania.

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(5, 32)

ing the occurrence or non-occurrence of cyclic and otherwise clinically typical menstruation from an endometrium lacking the secretory phase is founded mainly on the false premise that the phenomenon invariably connotes failure of ovulation and luternization Novak (23), for instance, states "Is there any way of determining whether or not a sterile woman is ovulating? This question can be answered in the affirmative The most direct and logical method is through study of the endometrium just before an expected menstrual flow, assuming that the periods recur regularly If ovulation has occurred, the endometrium will show the characteristic secretory changes evoked by the corpus luteum hormone (progestin) If, on the other hand, there is a complete absence of secretory changes, it may be assumed that there is no corpus luteum, ie, that ovulation has not occurred " This statement is correct in its implication that the finding of a premenstrual endometrium justifies the assumption that ovulation and luteinization had taken place. It is unreasonable to assume, however, that the absence of the secretory phase in the endometrium obtained for examination premenstrually definitely indicates failure of ovulation and luteinization Their absence in the human being may be suspected but cannot be proved without recourse to serial sections of both ovaries which are available in a normal state only in instances of accidental death during the premenstruum Deductions drawn from autopsy or operative material are usually likewise inconclusive because the disease leading to the death of the patient or to a bilateral oophorectomy may have interfered with ovulation and luteinization It will be shown later that, in the human female, factors other than failure of ovulation, such as an inherent or acquired lack of responsiveness of the endometrium or a quantitative disproportion of the two ovarian hormones, may enter into the etiology of this form of menstruction. Hence, the two terms, "anovular menstruation" and "pseudomenstruation," are not synonymous When the diagnosis is based solely on endometrial findings, the term pseudomenstruation, originally suggested by Schroeder (26), is more appropriate

TABLE I —CONDITIONS WHICH LED TO VAGINAL OPERATIONS AND OPTIONAL CURETTAGE DURING THE PREMENSTRUUM IN 68 NORMALLY MENSTRUATING FERTILE WOMEN*

Case
39
5
3
4
5
ć
1
1
1
3
1
68

*All but 1 showed the premenstrual phase

THE INCIDENCE OF PSEUDOMENSTRUATION

The average cyclically menstruating woman of childbearing age shows a corpus luteum (secretory) phase in the endometrium after the sixteenth day of the beginning of her previous menstruation. We agree with Schroeder (27) that cyclic uterine bleeding at intervals of less than 21 days or a flow exceeding 8 days is evidently pathologic and is usually associated with follicle cystosis and endometrial hyperplasia

That pseudomenstruation is rarely encountered in fertile or potentially fertile women is herein shown by a comparative study of endometrial tissues obtained by curettage premenstrually from 68 regularly menstruating fertile women in whom the procedure was optional and performed as a routine measure in the course of vaginal plastic operations (Table I) The patients ranged in age from 22 to 47 years with an average of 363 years Each of them had borne I or more children, the average number was 3 The menstrual cycles of the 68 women ranged from 21 to 35 days, the average for the group was 298 days The duration of the menstrual flow in these women varied from 3 to 7 days and averaged 54 days Twelve of the 68 women (17 5 per cent) suffered from primary dysmenorrhea The endometrial specimens from each of the 68 women were obtained from 2 to 7 days (average 4 7 days) prior to the expected menstruation The endometria of all but i showed the secretory changes of the usual

premenstruum The remaining patient exhibited the phenomenon of pseudomenstruation. She was 36 years old and a mother of 4 children, the youngest of whom was then 9 years of age. She was voluntarily sterile since the last childbirth. Her menstrual periods were always regular, at intervals of 28 days, the flow lasting 3 days. She enjoyed good health but was annoyed by a relaxed vaginal canal for which a plastic operation was performed on April 24, 1933, when menstruation was just heginning. The endometrium recovered at the time of the operation was of the interval type, without the slightest evidence of progestin effect.

The contention of Shaw that the secretory phase is minarably present in the endome trium of women who menstruate cyclically and not excessively is based on a study of a relatively small group of patients, none of whom was within the scope of functionally sterile but otherwise normal women upon whom we made our previous and present observations. Some of his 28 patients whose time of the menstrual cycle permitted comparative study were sterile, but all of them had uterine abroids and "my ohyperplasia" to

account for the existing sterility In 1032 the senior author in collaboration with Dr Ziserman (20) reported on the occur rence of pseudomenstruction in nearly 50 per cent of 41 regularly menstruating women who were sterile without any discernible cause This was the first detailed report in the literature on the absence of the secretory phase in a considerable number of regularly menstruat ing women Passing mention of the condition in the human heing was previously made by Corner in 1927, Mazer and Hoffman (17) in 1929 and by Novak in 1930 In 1934, Anspach reported that, in his experience, 9 of 42 regu larly menstruating women treated for sterility, dysmenorrhea, and obesity showed no evi dence of the secretory phase in endometria ohtained premenstrually. In most instances of the Anspach series, the endometrium was definitely hyperplastic. In the same year, Tietze (30) found endometrial hyperplasia and absence of the secretory phase in 5 women who were menstruating at normal intervals and not excessively. In 1935 Jeffcoate re

ported on the absence of the secretory phase in 10 of 21 cases of sterllity "in the absence of any gross lesion or associated menstrual ab normality" In a few of these 10 patients he observed typical endometrial hyperplasia

A more exhaustive study on the occurrence of pseudomenstruation in functionally sterile women was reported recently by Bland et al Only 23 of their 50 regularly menstruating, functionally sterile patients, curetted premenstrually, showed the secretory phase. In 15 the endometrium was of the interval type, in 9 it was hyperplastic, and in the 3 remaining it was definitely atrophic. The studies of Anspach, Jeffcoate, and Bland, confined to the functionally sterile type of patients, con firm the original observations of Mazer and Ziserman on the high incidence of pseudo menstruation in regularly menstruating women who are sterile without an accountable cause other than an inadequate preparation of the endometrum

One of us (r1) has previously stressed the occasional presence of pseudomenstruation in patients suffering from primary dysmenor-thea Recently Lackner and Krohn noted 4 instances of non secretory endometria in a group of 16 regularly menstruating women suffering from dysmenorrhea. It seems that during the developmental period of puberty and adolescence, pseudomenstruation is also frequently present, accounting for the relative infertility even of those of the exposed guis under 17 years of age who menstruate regularly (21)

ETIOLOGY OF PSEUDOMENSTRUATION

Three independent factors may produce pseudomenstruation, namely, failure of ovulation (anovulator) menstruation), an inherent or acquired lack of uterine responsiveness, or a quantitative disparity in production of the two ovarian hormones

The presence of endometrial hyperplasa which occurs in one third of these patients points definitely to the first named etiological factor, namely, failure of ovulation and lutenization. This phenomenon is thus lucidly described by Tietze (31) "The human follide persistence with subsequent endometrial hyperplasia may he a periodic occurrence with subsequents."

rence I consider this a direct parallel to the non ovulating bleedings of monkeys (summer cycle) It is assumed that in the ovaries of such cases follicles periodically ripen and, in the absence of ovulation, produce follicular hormone over too long a period and then become atretic. The mechanism is similar to that of apes and guinea pigs-periodic excess of follicular hormone but without protracted follicle persistence as in women. The majority of such cases, usually presenting the quiet type of endometrial hyperplasia (i.e., simply an exaggerated proliferative phase), affordsome clinically, others anatomically—the deceptive information for menstruation without ovulation In our opinion, this so called menstruation without ovulation is nothing more than bleeding from a pathologically proliferative endometrium Anatomically the bleeding arises from a necrotic proliferative endometrium, but it is always a pathological proliferative endometrium. The connoisseur will recognize this. There are no grounds, at present, either to give up or to revise the well grounded conception of menstruction and the duality of the cycle ' We agree with Tietze that histologically the condition connotes an abnormal form of menstruction and have, in fact, repeatedly emphasized its interference with the normal process of conception Pseudomenstruation is, however, clinically indistinguishable from the normal type of menstruation because the rhythm and duration of the bleeding are basıcally normal

The second factor operative in the causation of pseudomenstruation is a developmental or acquired uterine defect which prevents the organ from responding to normal ovarian activity It is characterized by atrophy of the endometrium obtained premenstrually despite the presence of a normal level of estrogenie substance in the blood and urine Patients with such a defect usually show a marked degree of uterine hypoplasia which occasionally responds to huge doses of estrogenic substance, given repeatedly I week of the month only, to avoid pituitary inhibition (18)

A striking illustration of a purely uterine defect in the etiology of pseudomenstruation and associated sterility is the following

Γ B, aged 30 years, who has been menstruating regularly and not excessively since the age of it had been sterile without an apparent cause for several years Her uterus was small, hard, and retroverted and her adnesa neither palpable nor tender The Rubin test showed patency of the fallopian tubes at a normal pressure and the Huchner test indicated normal insemination of the cervical canal The unmodified Frank and Goldberger test was positive and her 24 hour output of urine vielded 13 3 rat units of active estrogenic substance, indicat ing a fairly good ovarian activity. A uterine curet tage, performed at the Mt Sinai Hospital under gas anesthesia on September 20, 1934, only 4 days before her expected flow, recovered only a few fibrous shreds (I ig 1) She was given hypodermically 22,000 rat units of progenon B (dihydroxyestrin benzoate) in 3 divided doses during the early part of October The following menstrual flow was profuse and appeared a week prematurely We (19) have previously described this response of the uterus to relatively large doses of estrogenic substance The patient was subsequently given 8,000 rat units of the same product in 4 divided doses and again curetted on November 7, 1034, 6 days before her expected flow A considerable quantity of endometrium was obtained which on examination showed an early secretory phase with focal areas of She menstruated on time hyperplasia (Fig 2) several days later and thereafter until March, 1035, when she conceived without additional treatment

The presence of a marked uterine atrophy. despite a normal production of the follicular hormone, scems to point definitely to a utering defect in the etiology of pseudomenstruction which, in this instance, was fortunately corrected by the administration of 2 courses of relatively large quantities of estrogenic substance Inasmuch as the product does not stimulate the ovaries but exerts its influence on the muellerian tract, it is reasonable to assume that the pseudomenstruction and associated sterility were not due to failure of ovulation We have seen instances of endometrial atrophy (in women suffering from primary amenorrhea and in castrates) in wbich the administration of as much as a half milhon rat units of estrogenic substance failed to produce the required endometrial growth preparatory to progestin administration by the Kaufmann technique

The third probable cause of pseudomenstruation is a quantitative or qualitative disharmony between the two ovarian hormones, necessarily resulting in an inadequate preparation of the endometrium and suppression premenstruum. The remaining patient exhibited the phenomenon of pseudomenstruation She was 36 years old and a mother of 4 children, the youngest of whom was then 9 years of age. She was voluntarily sterile stace the last childbirth. Her menstrual periods were always regular, at intervals of 28 days, the flow lasting 3 days She enjoyed good health but was annoyed by a relaxed vaginal canal for which a plastic operation was performed on April 24, 1933, when menstruation was just heginning The endometrium recovered at the time of the operation was of the interval type without the slightest evidence of progestin effect

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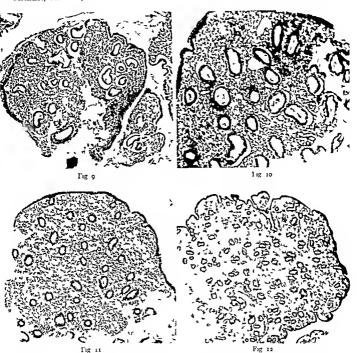
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Figs 9 (X 60), 10 (X 60), 11 (X 65) 12 (X 22) Photo micrographs of specimens of endometrium obtained from regularly menstruating sterile women a few days before the

expected flow All of these women have subsequently men struated on time. Note especially the total absence of the secretory phase

the subsequent menstrual flow. Six additional patients falling into the citegory of pseudomenstruation in sterile women are not included in this report because the expected flow failed to appear following the curettage. For the sake of accuracy, it was assumed that they would not menstruate on time irrespective of the operative interference. The endometria of 46 of the 65 women (70.8 per cent) showed the secretory changes of the precent).

menstrual period However, in 8 of this group of 46, unmistakable areas of hyperplasia were present, indicating the presence of a disproportion between the two ovarian hormones (estrogenic substance dominance) The endometria of the 19 remaining patients of the group of 65 (29 2 per cent) showed no evidence of a secretory phase (pseudomenstruation), despite the fact that the expected menstruation occurred from 1 to 6 days following the

TABLE II -DATA RELATIVE TO 19 REGULARIA-MENSTRUATING, STERILE WOMEN WITH PSEUDOMENSTRUATION

Care	i	Vien	rual hist to cur	ory in sel.	ntion	
	Age.	Pays of bleed ng	Davs of com plese eycle	Pay of cycle when curetted	Day after curet tage per od apprared	H stol gre d agnores of endometrum
-	10	-0	28	2	1	Hype plasta
2	20	+	28	26	2	Нуроріа на
- 1	34	4	13	2.2		tlypoplasia
	33	3 4	31	3		Il pepla a
	31	2.3	40 41	1		Hyperpla 14
ó	18	3-4	- >	22	0	Hyperpla is
7	1	2.4	25	3		Hyperpla 1a
	23	5	13	24	4	Problerati v
0	31	3.4	25-15		1 2	Proliferati 'e
0	42	3-1	23	23	3	Prohiferati re
11	1		16-14	1		Problemative
12	29	5-0	30	2		Prol ferat v
13	32	4-4	16 >	1.3	!	Pn tiferari e
14	31	3.4	28	1 3		Problemu e
14	31	4-5	13	24	1 4	Problemus
16	10		21 25	23	1_2_	Problera: e
17	23	10	2 -2	23	1	Proliferati v
15	32	5-0		23	-	Proliferati +
	10		18-50	1 2		Pn literat ve

curettage in each instance (Table II) Ot the 10 abnormal endometria 12 were of the interval (proliferative) type 4 hypoplastic, and a hyperplastic (Figs 5 to 12)

CONCLUSIONS

t Cyclic uterine bleeding, clinically indis tinguishable from normal menstruation from in endometrium totally lacking the usual secretory changes, occurs in 30 per cent of sterile women who present no abnormality

. The condition is rarch encountered in fertile or potentially tertile women

. The condition may be due to failure of ovulation a developmental or acquired lack of responsiveness of the uterus to a normal evarian activity or to a quantitative or qualitative disharmony between the two ovarian hormones estrin and progestin

When the diagnosis is based on endometrial findings alone, the term "pseudo menstruation" is preferable to "anovular menstruation' because the presence of the latter cannot be proved without concomitant study of the ovaries

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CHORDOMA

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THE suggestion that notochordal remains might form the starting point of a characteristic type of tumor was originally made by Mueller in r858 Up till then interest in the structure and fale of the primitive skeletal axis had been aca demic and anatomical but with this new observation the notochord acquired a practical significance The tumor-named "chordoma by Ribbert—is one of considerable interest. its structure is distinctive and it has a curious tendency to appear toward the extremises of the vertebral column Reports of chordoma have become increasingly common during the last few years yet in any individual experi ence they are sufficiently rare to warrant the following account of two cases which we have had an opportunity of studying

Case r Mrs G aged 44 years was admitted to the Royal Infirmary complaining of weakness and loss of power in the legs. There was a history of a previous blow over the lumbar part of the spine but this had occasioned her but trifling inconvenience and had apparently been completely recovered from

A year before admission she had had a severe attack of cramp in the left leg lasting 10 minutes a fortnight later she suffered a further attack of pain in the coces geal region and this was followed by the development of a large bluish black patch on ber left thigh Shortly afterward shooting pains began in both legs and 8 months prior to admission the limbs became stiff and she began to lose weight. Two months later she noticed that her legs were becom ing numb and the numbness gradually spread until it affected both lower limbs below the knee

On examination there was found a large swelling in the region of the lower lumbar vertebra, the tu mor was stony hard in consistence but not adherent to the skin Large dilated vessels were apparent in the subcutaneous tissues The lower limbs were the site of an almost complete flaccid paralysis

Radiological investigation revealed a fairly regular area of destruction on either side of the fourth lum bar vertebra the articular and spinous processes having almost completely disappeared. The appear ances were held to indicate neoplasm (Fig. 1) At biopsy a portion of an exceedingly vascular

tumor was removed for uncroscopical investigation From the Department of Claucal Surgery Edinburgh Um

s ersits

Histological appearances The tumor was com posed of sheets of cells separated into lobules by strands of connective tissue necrosis was present at the central part of the lobules and considerable hemorrhage had occurred in certain areas (Fig. 2) The cells were characterized by vacuolation of their cytoplasm (Fig. 3) the vacuolation was due to the accumulation of intracellular mucin and the appearance was exactly similar to that of the physali phorous cells originally described in connection with notochordal remains by Virchow. In some areas progressive intracellular accumulation had led to rupture of the cell envelope so that the appearance was one of a syncy tium like mass of mucinoid ma ternal containing scattered nuclei (Fig. 4) As a general rule the more perfectly preserved cells were to be observed toward the pemphery of the lobule and it was in this situation that mitotic activity was maxımal

The nuclei varied greatly in size shape and stain ing reaction. The majority were ovoid, but round and polymorphous forms were also present \u clear degeneration was common in the syncytium like mass and in the necrotic areas and in some nelds intranuclear vacuolation was observed though extreme examples of this phenomenon as described by Stewart were not present (Fig. 5)

The stroma was composed of a series of fibrous tissue septa in which the vessels of the tumor were running. Those cells of the lobules which lined the septa were compressed and in places had invaded

the fibrous strands

Case 2 Mrs McD was 62 years of age when she was admitted to the Royal Infirmary Seventeen months before she began to expenence a gnawing pain in the region of the sacrum followed after an interval of 6 months by the appearance of a swell ing about the size of a walnut in the same situa tion These features appeared spontaneously there was no history of preceding trauma

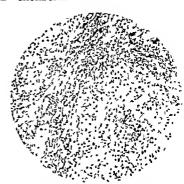
It that time the patient sought medical advice the swelling was found to be soft in consistence and was incised apparently in the belief that it was an abscess but after incision it increased rapidly in size and at the site of incision a large ulcer de veloped A diagnosis of sarcoma of the sacrum was accordingly made and was apparently supported by the fact that she began to suffer from weakness in the right leg shooting pains in the right foot and frequency of micturition-the evidence at least of a progressive lesion

After a course of deep x ray therapy she improved for a time thereafter the tumor became much larger and she was admitted to the Edinburgh Royal Infirmary



Fig. 1 Anteroposterior roentgenograph of Case 1 Note the destruction apparent at each side of the body of the fourth lumbar vertebra The transverse processes have disappeared

When submitted to examination there, a large tumor was found to be present in relation to the lower part of the spine, the main bulk of the tumor projecting backward and downward from the sacrium Above, it extended to the mid lumbar region, below it reached as far as the gluttal fold on the left side and to a point just above that level on the right (Fig 6) Laterally, its margin was situated



lig 2 Photomicrograph of tumor. The tumor is broken up into lobules by strands of fibrous tissue. The cells of the lobules show marked vacuolation. XSO

immediately behind the greater trochanter. The surface of the tumor showed obvious areas of bossing and the superficial veins were enormously distended. Three small sinuses were obvious at the site of the previous incision (Fig. 7).

The tumor on palpation appeared for the most part firm and hard in consistence, but here and there were areas of softening, almost suggesting fluctuation

bloominal examination conveyed a sense of full ness and increased resistance at the pelvic brim, while the digital investigation of the rectum revealed a tumor bulging forward through the posterior rectal wall, the growth again had suggestive

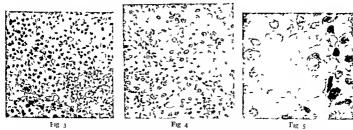


Fig 3 High power photomicrograph showing the vacuolation of the cells ×140

Fig 4 High power photomicrograph to show syncytial

massof mucinoid material with many scattered nuclei ×130 I ig 5 Photomicrograph to show vacuolation of nuclei ×550



Fig 6 Lateral photograph showing the extent of the tumor in Case 2



Tib. 7 The surface of the tumor in Case 2. The sinuses at the site of the previous incision are well seen

areas of softening although the main consistence was firm almost to hardness

was nim almost to hardness Radiological exemination (Fig. 8) was carried out with great difficulty and owing to the adoposity of the patient the roenigenograms were far from per feet. They showed however that the sacreum and and ill defined tumor, which applied to be more dense in the position of the bony column. On the right side the sacro that going was almost completely destroyed. On the left side also it had been invaded but to less extent by the tumor.

A fruttless attempt was made to remove the tumor. When the skin and subcutaneous tissues had been incised the underlying muscles were seen to be stretched out over the growth which was partially surrounded by a fibrous capsule. The surface was toulated asset where the neoplastic process had extended into the muscle. Owing to its infiltrating character and to pronounced vascularily radical character and to proton the surface was the surface was substituted by the surface of the surface was the surface of the surface was the surface with the surface was substituted as the surface was sufficient to the surface was removed for histological study.

Histological examination. The microscopic appearances were essentially similar to those of the first case but the tumor was less cellular and the individuality of the cell more uniformly preserved Lobulation by fibrous centu was less marked (Fig. 6).

The recognition of notochordal tumors is a matter of the last 30 or 40 ears, and is due mainly to the observations of Ribbert Luschla in 18,6 had reported a cumous jelly like intracranial growth protruding from the chivis, but could not account for its presence Virchow, a year later, described a similar tumor in a comparable situation, which his histological observations led him to believe was of cartilaginous origin. He regarded the cartilage cells as degenerate, and accordingly

referred to these growths as physaliphorous ecchondroses

In the following year, Mueller suggested that similar tumors might grow from noto chordal remains. He made a close study of the development and histology of the noto chord and was able to show that in the fetus it extended cranially as far as the sella turcical testing the showed that "rests" of notochordal tissue could occur in the basilar cartilage while in the spheno occipital synchondrosis it frequently persisted as a small mass of soft jolly like tissue resembling the nucleus pul posus of an invertebril disc

It was left to Ribbert to produce incontro vertible proof and to suggest the name chor doma Ribbert sevidence is of three kinds—anatomical histological, and experimental He emphasized that, as regards the skull, the tumor is constantly situated in the midline where notochordal tumors would invitably occur. From a histological study of the tumors, he concluded that the resemblance of the tumor cells to degenerate cartilage was more apparent than real and he was unable to find any areas of normal cartilage to find any areas of normal cartilage.

His experimental evidence is very important. He punctured the intervertebral disc of a rabbit so that the notochordal tissue of the nucleus pulposus was extravasated outside the vertebral column. Subsequently the hermated tissue proliferated and presented the histological features of the physaliphorous exchondroses.



I ig 8 Roentgenograph of Case 2 The sacrum is completely destroyed and the indefinite outline of the tumor can be vaguely determined

It is now fairly clear that the phy saliphorous ecchondrosis of Virchow—or, to give it the more accurate title of Stewart—ecchordosis phy saliphora spheno-occipitalis, is not a true tumor. It is not infrequently encountered by chance during autopsy for some unrelated condition, and it appears more likely that it is a true persistence of notochordal tissue which may, however, undergo neoplastic transformation into chordoma.

Since 1894, a considerable series of notochordal tumors have been added to the literature, and the condition is now a well defined clinical and pathological entity

The localization of the tunor — One of the most curious features of chordoma is the site localization — The original descriptions were of intracranial growths in the region of the spheno occipital synchondrosis, and Henning was the first authority to report on extracranial chordoma—in the sacro coccygeal region of a young infant. The occurrence of the tumor in sites other than the extremities of the spinal column was not appreciated until Syme and Capell (1) in 1925 reported a chordoma of the cervical spine. Capell (1) has since reported the development of the tumor in the dorsal spine.

We have traced in the literature the records of 103 cases, of which the distribution is as follows



lig o The histological appearances in Case 2. The tumor is essentially similar, but less cellular. Cell vacuola tion is again prominent. X100

Cases
33
33
2
56
J+
6
Ī

The spheno occipital group includes growths which project intracranially from the synchrodrosis, and those (11 of 33 cases, 1c 33 per cent) which project into roof of pharynx

To explain the site localization of chordoma, it is necessary to review briefly the development of the notochord

The development of the notochord In the second week of intra-uterine life, a linear furrow is formed in the central axis of the embryonic area by a thickening of the embryonic ectoderm. This is the primitive groove, and from its antenor end, the growth in length of the embryo takes place. At the antenor end of the groove, an opening is situated which represents the dorsal extremity of the neurentenic canal.

In the third week, the ectoderm has extended forward from the primitive groove for a considerable distance, and a central furrow is apparent the lateral walls of which even-

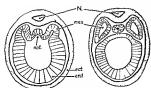


Fig to Diagram to show the method of formation of the notochord by evagination from the dorsal aspect of the archenteron (After Trazer)

tually expand grow toward each other and fuse to form the neural tube

Immediately below the dorsal cetoderm is the archenteric eavity with its enclosing layer of entoderm. In the midling of the both eeto derm and entoderm are in direct apposition but laterally the two layers are separated by the paraval mesoblast.

By about the middle of the third week a strip of cells along the median dorsal wall of the entodermal archenteron are evaginated (Fig 10) to form a tube—the notochordal cand—which later loses its lumen and becomes hnally detached from the entoderm to form the notochord, a solid rod of cells interposed be twen the developing neural groove and the archenteron

The fate of the notochord The paravial meso derm lattr comes to surround the notochord and to form a sheath for it as also for the neural tube the sheath is the anlagen of the vertebral column

The major part of the notochord begins to disappear in the second month of fetal life and from the point of view of the present communication interest mainly centers round the situations in which it may or does persist

The membranous sheath becomes chondrihed and later ossuhed forming at the anterior extremity the bast occupit and the bast sphenoid and elsewhere the vertebral column. The progress of ossiheation in the individual vertebra leads by pressure to the disappear ance of the notochordal tissue in the center of the vertebral body but in the intervertebral spice, a spheroid of tissue persists as the nucleus pulposus At the antenor end, the notochord traverses the middle of the body of the dens and passes up to the cartilagmous base of the skull in the suspensory ligament of the dens. At first it is included between the developing hald of the skull base, but further forward, it passes on to the pharyngeal surface of the base, and finally turns upward to terminate in the skull base posterior to the dorsum selle (Fig. 11).

Such are the usual cranial relationships of the notochord, there is no doubt, however, that in the region of the spheno occupital synchronicosis the notochord may make a further loop upward and come to he on the actual cranial aspect of the base (Fig. 11). It may be said, therefore, that normally in one, and possibly in two situations in relation to the skull base, the notochord may escape being confined within or compressed by, cartilage or bone

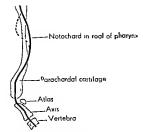
1 At the site of the intrapharyngeal loop 2 In the region of the spheno occipital synchondrosis where it often makes an intra eranial loop

In the sacrococygeal region a destructive fate also befulls the posterior end of the noto chord. Along with its membranous sheath it extends for a considerable distance become the extent of the adult vertebral column—and even beyond the termination of the membran ous sheath it is continued into the tail end of the embryo (Fig. 12). With the curtailment of the coccygeal end of the vertebral column and the disappearance of the tail bud, a considerable part of the caudal end of the noto chord must disappear.

chord must disappear

The relation of de clopment of tumor growth

It is significant that notochordal itssue nor
mally persists in the intervitebral discs, that
abnormal persistences have been reported on
the crainal aspect of the spheno-occupital
synchondrosis, and that the majority of chor
domas arises in the basicranial and sacro
coccygeal regions. The factor common to
these situations of normal, almormal, and
pathological occurrences of notochordal tissue
is the absence of bony compression. It seems
that once encased in bone, the notochordal its
sue does not usually survive, but in the ab
sence of a bony envelope it may, and offer
does, persist. In the situations where ab

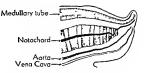


lig ii Diagram to show the course of the nolochord at the base of the skull. The usurd course is indicated by the continuous line. The interrupted line represents the occasional incursion on to intracramil aspect of the base (lifter keith.)

normal persistences have been shown to be likely, there is the further feature that the notochordal tissue is not even restrained by a sheath of fibrous tissue as in the case of the nucleus pulposus of the dises. That these facts may have some relation to subsequent tumor development is likely. Thus Newlands ascribes chordoma to persistence of notochordal tissue when it escapes inclusion by bone, while Rib bert's (8) classical experiments suggest that in these situations it may be the ibsence of proper fibrous tissue encapsulation that is the significant circumstance.

The relation of trauma to the chordoma In the first of our cases, the lumbar segment of the spine was affected, and there was a detinite history of injury preceding the development of the tumor. It is difficult to dissociate the two as cause and effect, and there is additional evidence that the relationship may be a direct one. The occurrence of such tumors in the intermediate part of the spine at once suggests an origin from the nucleus pulposus of the intervertebral disc, and Ribbert's experimental production of chordoma following the release of the nuclear tissue from its fibrous sheath by puncture suggests that the traumatic influence may be important.

The recent researches of Schmorl and his Dresden co-workers seems to strengthen this yiew, for the escape of notochordal tissue from the disc into the spongy tissue of the



lig 12 Schematic representation of the caudal relations of the notochord, which is here continued beyond the termination of the vertebral column

vertebral body and anterior and posterior aspects of the body is an occasional feature of spinal injuries. Schmorl indeed remarks on the occurrence of nodules of notochordal tissue on the posterior aspect of the lumbar bodies, but suggests that in some cases they may have a congenital origin. Dandy, too, has operated on 2 cases in which spinal cord compression has resulted from tumors growing from the back of the vertebral bodies, and apparently cartilaginous in nature. In the light of recent work, they are certainly of notochordal origin and their structure is in all respects similar to the physaliphorous ecchordosis of the spheno-occipital region.

It would appear, therefore, that chordomas may arise in two ways

t From the persistence of notochordal

2 From the traumatic release of notochordal tissue from situations in which it is normally found but imprisoned in a fibrous envelone.

The pathology of chordoma The account of the pathological features of chordoma given by Stewart is so complete that addition to it is impossible

The tumor is usually encapsulated, rounded, and lobulated by a scries of thick fibrous septa Its cut surface is glistening, and in many of the lobules there is mucoid degeneration so that the consistence of the tumor is semi solid Hemorrhages of varying size and age are present in those degenerate areas, but when the mucoid change is less advanced the tumor may appear granular and opaque

The Instological features All the recorded cases reviewed by Stewart were broken up into lobules by a stroma composed of fibrous septa. The connective tissue of the stroma is prone.

to hyaline degeneration and may be infiltrated with 13 mphocytes, polymorphonuclears or cosmophile cells Frank hemorrhage is not infrequently observed and evidence of former hemorrhages sometimes exists in the form of pigment-distended reticulo endothelial cells. The parenchyma of the tumor presents a very variable appearance. Active cellular tussue may be present, the cells polygonal in outline and with fairly well defined borders. These cells are more usually present toward the periphery of the lobule, but occasionally com-

46

prise a whole lobule

The mechanism of mucoid regeneration is invariably apparent. As the cell is traced from the periphery of the lobule toward the center, droplets of mucin collect within the cyto plasm, giving rise to the appearance of vacuo lation. The accumulation of mucin proceed until the cell is distended and the nucleus displaced until ultimately, the cell envelope, unable to contain the increasing mass of mucin, ruptures. The mucin now escapes and lies free between and around the shrunken cells in the central area of the lobule.

The nucles of the cells may vary greatly, in appearance, but are for the most part oval or spherical. In the areas of greatest mucoid change, however, they may be shriveled and crenated. In the more cellular areas they may contain one or more vacuoles of mucin and occasionally may become so distended that they are ballooned out forming the typical physaliphorous nuclei first described by Stewart. Hyperchromatism and active mitotic activity are only present in certain cases

of malignancy Relation of the histology to the extomorphosis of the notochord It is now apparent that, in their histology notochordal tumors reflect the extomorphosis of the original notochord Capell, Newlands and Woolard have drawn attention to the fact that the notochord at first consists of a rod of polygonal epithelium like cells arranged in front of the developing nervous system along the whole length of the embryo These cells originally have no peripheral delimitation from the surrounding structures, but they soon acquire a sheath which has developed from the adjacent meso derm

The cells next undergo mucinoid degenerition, toward the periphers of the food the mucin is discharged from the cell and comes to surround the column as a secondary rinternal sheath. In the center of the column the mucin is contained within the cell envelope, and to the consequent turgescence of its cells the notochord owes its supporting preperties.

In the last stage—seen in the intervertebral disc—when the notochord is enclosed in fi brous tissue, the cell envelope may be de stroyed and the nucleus left embedded in a syncytium like mass of mucinoid material

There are thus three stages in the cyto morphosis (1) the stage of non-vacuolated polygonal cells, (2) the stage of vacuolated mucin containing cells, (3) the syncytial stage of intercellular mucoid accumulation

These stages are reproduced with faithful exactitude in chordoma, and from the pre ponderance of any one of the above appear ances in individual tumors, some information as to its relative malignancy may be gained. Thus, the cellular tumors, with little or no xecuolation, represent the most malignant type, the syncytual arrangement of the tumor cells the most benigmant form of neoplasm.

CLINICAL ASPECTS OF THE CHORDOMA

The cranial chordoma The intracranial type The intracranial type of tumor begins near the spheno occipital synchondrosis and tends to extend at the expense of the surround mg bone, and of the brain. Thus it may erode the dorsum sellie and invade the pituitary while it also spreads ultimately to involve the brain stem.

The nasopharvageal lumor is situated in the roof of the phary nv but it may spread to in volve the nose and jaws or the mavillary antra in at least one reported case, the tumor—in a newborn infant—actually projected from the mouth

The sacrococcygeal chordoma In many of the published cases of sacrococcygeal neo plasm injury appears to have been a pre cripitating factor but in our case, no such trauma appears to have occurred

Usually, as in the present case, the first evidence of trouble is severe pain in the region of the sacrum, followed, after an interval, by the appearance of the tumor The tumor may show its most exuberant growth either anteriorly or posteriorly, if it tends to spread to the front, interference with mictirition and defecation are early evidences of its presence

In virtue of its position, the tumor may early implicate the pelvic nerves indeed, it may be that the visceral disturbances mentioned are the result of disordered nerve im pulses rather than of mechanical pressure, though it is likely both factors are at work

The tumor is at first situated above the midline, but, as it enlarges, its situation becomes more asymmetrical. The surface frequently shows bossing, and the veins of the subcutaneous tissues become prominently ddated

In the present case, there was, in addition to the features stated, marked weakness of the leg, and pain in the distribution of the seiatic nerve The latter, as well as the other gluteal nerves, may be surrounded and intiltrated in large tumors which grow down into the region of the buttocks

The spinal chordoma No region of the spine is immune, but chordoma is relatively rare in the lumbar region A history of antecedent trauma is common

The tumor usually commences on the pos tenor aspect of the vertebral bodies, and it follows that the earliest signs of its presence are due to its compressive effects on the spinal cord In the higher segments of the spine the sequele are spastic paraplegia below the lesion with increasing sensory disturbance until numbness and anesthesia result

In the lumbar region, however, the neoplasm in its advance implicates the eauda equina, and there is a flaccid paralysis of irregular distribution in the lower limbs, as in the first case reported here

The lumbar chordomas are more often preceded by a history of recurrent attacks of pain than the others, since the sensory nerves are more rapidly encompassed

PROGNOSIS IN CHORDOMA

The prognosis in chordoma varies with the position, the duration, and the histological type of the tumor In some cases—as in small intracranial and intrapharyngeal tumors, and in small intraspinal tilmors—removal has been successfully accomplished Young has also been able to extirpate completely a large sacrococey geal tumor In the sacrococcy geal chordoma reported here, however, the extension of the tumor beyond its capsule, and its vaseularity made removal impossible

In the event of removal of the tumor proving impossible, even a simple chordoma is ultimately fatal from encroachment on vital structures This eventuality may be delayed for many years-as in Young's ease-however, in the more malignant types of tumor, histologically very cellular, death may result very soon after the tumor becomes apparent

TREATMENT OF CHORDOMA

It is evident that no universal technique for the management of chordoma can be indieated Removal should be attempted in all save late eases, as even partial resection has been followed by improvement in symptoms

When the situation of the growth or other erreumstances render operation hazardous or impossible, recourse may be had to radium or deep x-ray therapy, though these have so far proved of very limited value

Our thanks are due to Professor Sir John I raser for his permission to investigate and report these cases, which were under his charge in the Royal Infirmary Fdinburgh Mr D B Smith has been responsible for the photomicro graphs and our grateful thanks are due also to him

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DERMOID CYSTS OF THE HEAD AND NECK

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HILLE dermoid cysts of the head and neck are of relatively infrequent occurrence, they should nevertheless be of interest to both those who specialize in surgery of the bead and neck and to general surgeons as well From 1910 to 1935, inclusive, 1,495 patients with dermoid cysts have been examined at The Mayo Clinic.

The distribution of the x 495 cysts, which involved the entire body, may be noted in Figure r. The greatest number of cysts (44.4 per cent), which included pilonidal cysts, occurred in the postanal region, 42 r per cent of the cysts were found in the ovaries. Excluding patients who had cysts involving the brain and meninges, 103, or 60 per cent, of the patients had cysts that occurred in the regions about the head and neck.

SITUATION

We have divided dermoid cysts of the head and neck into four groups, in accordance not only with their anatomic situation, but also with the embryonic structure from which each group is derived (1) cysts about the eyes and orbits, originating along the naso optic groove, (2) those about the nose, resulting from intru sion of the frontonasal plate between the em bryonic nasal dermis and mucosa (3) those about the floor of the mouth and in the sub mental and submaxillary regions originating from the upper branchial arches, and (4) a miscellaneous group, most of which occur in the midline and develop during closure at the midventral and middorsal lines of the body (Fig 2)

Of the 103 dermoid cysts about the head and neck, 49 5 per cent came under the classi fication of group I, 12 6 per cent of group II, 23 3 per cent of group III and 14 6 per cent of group IV (Fig 3)

From the Section on Laryngology Oral and Plastic Surgery The Vlayo Clinic Read before the meeting of the Section on Otolaryngology of the College of Physicians of Philadelphia Philadelphia Tennsylvania October 21 1936

EMBRYOLOGY AND PATHOLOGY

Dermoid cysts in general have been classified on the basis of their pathogenesis as well as their gross and microscopic appearance into the following three types

- Congenital dermoid cysts of teratoma type These are complex in structure and arise from embryonic germinal epithelium According to the blastomere theory, such a tumor is thought to originate in a developing blastomere, some cells of which become sepa rated or displaced, the remaining cells of the blastomere develop into normal cells, whereas the misplaced cells lie dormant Later, how ever, perhaps through some chemical process, these dormant cells become activated and evolve a dermoid or a teratoma Dermoid cysts of this type have a thick wall which con tains elements derived from any one, or from all three, of the germinal layers epithelium, bone, and cartilage These cysts also contain well developed structures, such as skin, hair, nails, and teeth Brain and glandular tissues frequently are present. Usually cysts of this type are confined to the ovaries and testes, al though occasionally they are found elsewhere, as in the sacral region
- 2 Acquired implantation dermoid cysts. These are merely inclusion cysts that develop as a result of trauma. A portion of the skin is carried into the deeper structures of the wound where the dermal cells form a cyst lined with squamous epithelium. They occur par iticularly on the hands and other exposed parts of the body.
- 3 Congental inclusion dermoid cysts. These develop along the lines of embryonic fusion, such as the midventral and middorsal lines and the branchial clefts. They are cysts that develop from mclusions of displaced dermal cells along such lines of fusion. His tologically they are very simple in structure. Their walls usually are thick and fibrous and are lined with squamous epithelium that resembles skin and contains hair follicles and

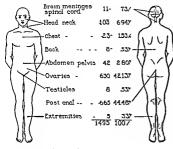
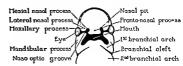


Fig 1 Distribution of 1,495 dermoid cysts encountered at the clinic

sweat and sebaceous glands The cavties of these cysts are filled with a greasy cascous material which is often mixed with hair Such structures as cartilage, bone, and lymphoid tissue are said to be found occasionally Many of these cysts have a sinus from which sebaceous material can be expressed and from which, in some instances, hairs can be seen protruding

Almost all of the 103 dermoid cysts in this senes which involved the head and neck contained sebaceous material, but in only 30 per cent of them were tangles of hair to be found Microscopically, their walls were typical of congenital inclusion dermoid cysts. With the exception of one cyst in the upper outer quadrant of the right orbit in which a little cartilage was discovered, no cartilage, bone, or lymphold tissue was found in any of them None contained such organized structures as teeth, nails, or glandular tissues. Many were infected, their capsules being somewhat adherent to the surrounding tissues and their cavities containing much pus intermixed with the sebaceous material

It is interesting to observe that in one case in which a dermoid involved the soft palate a squamous cell epithehoma, grade II, developed The patient was a woman 53 years of age. She had noticed the growth for about 18 months A year prior to her registration at the clinic it had been excised, but it had promptly re-



I 1g 2 Origin of cysts of head and neck

curred and had grown rather rapidly Examination revealed a rounded, non-ulcerated, and well localized mass. On excision, the dermoid and the malignant lesion were discovered, and consequently the bed of the tumor was thoroughly cauterized. The patient made a complete recovery.

Cysts of group I which occur in and around the orbital region develop, as has been said, along the naso optic groove which lies between the maxillary and mandibular processes. During fusion of these processes, small groups of cells dip down into the deeper tissues and become segregated from the surface cpithelium. In time these epithelial rests develop into dermoid tumors. It is not surprising that a greater percentage of these cysts occur in the orbital region than elsewhere about the head and neck when one considers the complexity of the embryonic development of the eyes and lids, which are situated at the outer angle of the naso optic groove.

The pathogenesis of dermods of group II, which occur over the nasal bridge, is difficult to explain. Luongo interpreted their formation as follows "In the early embryo, the frontonasal plate, which forms the nose, consists of a lamina of hyaline cartilage covered."

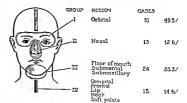


Fig 3 Classification of cysts of head and neck according to groups



Fig 4 Pre auricular sinus branchial cleft in father and

externally with skin and internally with mucosa. After the third month of embryonal life,
bony tissue extends in between the cartilage
and skin. The bony tissue will form the nasal
bones. The cartilage becomes absorbed dur
ing the process of ossification. During the
gradual separation of the skin from the cartilage of the frontonasal plate by the intrusion
of the nasal bones, small portions of the skin
or epithehum become sequestrated and develop into dermoid cysts." Dermoid cysts
that occur in the base of the columella and
in the adjacent upper lip may develop during
fusion of the two mesal nasal processor.

Dermoid cysts of group III, which arise in the floor of the mouth and in the submental region, are derived from ectoderm seques trated during union of each first and second branchial arch with its fellow of the opposite side. There is also a group of cysts in the zygomatic and parotid regions (Fig. 4) which clinically resemble dermoid or branchial cysts. From the embry ologic point of view, of course, these should be dermoid cysts arising from the branchial arches, however, they have been classified as branchial cysts because of their microscopic appearance.

Cysts of group IV, those in the suprasternal fossa and in the occipital region, are formed during closure of the midventral and mid

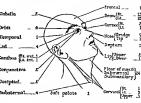


Fig 5 Situation of cysts of head and neck

dorsal lines. Fusion of the branchial arches is doubtless responsible for some dermoids in the laryngeal and upper cervical regions. Such a cyst in the lower lip results from union of the mandibular processes, whereas a cyst lo cated in the soft palate results from the fusion of the palatine plates which grow from the mavillary processes to the midline to form the palate.

Dermoid cysts in the frontal region and other parts of the cranium arise during fusion of the cranial bones. As has been explained by several authors, the developing cranial bones lie between the embryonic skin and dura. As the bones grow toward each other to form the suture lines, groups of dermal cells become cut off from the surface epithelium, and this results in the formation of dermoid cysts.

From pathological study of these rog der moid cysts, it appears that practically all der moids about the head and neck are very simple cysts of the congenital inclusion type. Al though they may arise from several different embryone structures, fundamentally all have a similar origin

AGE OF PATIENTS AND SIZE OF CASTS

Of the 103 patients, 53 (51 per cent) were males and 50 (49 per cent) were females. The ages of the patients at the time of operation varied from 14 months to 72 years, about 60 per cent being between the ages of 15 and 35 years. This, however, does not correspond in any degree to the ages of the patients at time when the dermoid first became notice

TABLE 1 —ACE AT WHICH DESMOD CYSTS OF THE HEAD AND NECK WEST FIRST NOTICED

160	Cises	Per cent
At both	32	37 2
I rom buth to 1 ye ir	9	10 1
2 10 5 3 5 7 5	13	t5 1
6 lo 10 years	4	46
11 lo 15 3¢ 1fS	6	0.3
16 10 20 30 113	6	69
21 10 30 3 215	0	10 4
31 lo 40 ye 11'S	1	1 1
41 to 50) (175	2	2 3
51 to 59 years	_2	2 3
Total	86	
Age when first noticed unknown	17	

able As may be noted in lable I, 37 2 per cent of the timors were present at birth, whereas 62 7 per cent were observed by the fifth year. One prittent did not notice the cyst

until he was 59 years old

The cysts ranged from 4 millimeters to 10 commeters in diameter, the larger ones being located in the floor of the month and in the submental region. In 26 per cent of the cases there was a history of previous attempts at removal or of incisions for draining.

DERMOID CASTS OF THE ORBITAL RIGION

Tifty one eases in which dermoid cysts occurred in the orbital regions have been encountered at the clinic. The most common site for these tumors is on the outer third of the brow, in fact, more dermoids are encountered in this region than in any other part of the head and neck, 31, or 60 per cent, of the 51 cysts being in this situation (Fig. 5)

The left brow was involved more frequently than the right. These 31 dermonds varied from 1 to 6 centimeters in diameter, the majointy measuring 2 or 2 5 centimeters. Larger c)sts extended laterally into the temporal regions or down into the upper cyclids. All but one were evulent by the fifth year, and 52 per cent were present at birth. Several of them were not noticed until they were injured accidentally In a few eases tranma caused the affected tumors to undergo a sudden in crease in rate of growth. I xcept for slight tenderness or a discharging sinus, which occurred in 2 cases, these dermoids were practically symptomicss. The patients came for



115 6 Dermoid cyst of right brow

operation merely for reminal of a disfiguring "himp" on the brow (I ig 6). On palpatini, if we of the cysts, especially smaller ones, were tirm, the majority, however, were soft and cystic. In some cases a sense of fluctuation could be cherted, and in the case of large tumors a doughy leeling, so characteristic of dermoid cyst, was present. Some were fixed to underlying bone whereas others were freely movable.

On excision, several of these tumors were found to have produced crafter like depressions in the underlying bone. In an occasional case, cord like extensions into the surrounding soft and bony tissues were discovered. Dermoids are but rarely seen at the inner angles of the brows. In our experience we have seen only 3 such cases.

Six of these 51 orbital thermoids were located within the orbit (Fig. 5), 5 of them being in the upper outer quadrant of the right orbit. When large, such timors have a tendency to

produce exophthalmos

While we have not seen a derimind involving the lower lid, 4 deriminds involving the impier cyclids and 2 of the earthi were encountered (lig 5). I wo of these deriminds were as sufficient size to cause blurring of vision. From



lig 7 Dermoid cyst of the nose affecting both mother and daughter

one dermoid, situated on the comea, three hairs protruded and caused considerable irri

tation of the conjunctiva. Ihe treatment of orbital dermoid cysts is excision. When adherent to bone, the periostical attachment must be removed along with the tumor. Cord like extensions should be removed, when present, if a cure is to be effected.

DIRMOID (YSTS OF THE NOSE

Of the 13 dermoid cysts that involved the nose, g involved the bridge, 1 the tip, 2 the base of the columella, and a the septum (Fig 7) All of those on the bridge were first noticed in infuncy, 6 of them at birth. They varied from 4 millimeters to 2 5 centimeters in di ameter averaging about a centimeter historics obtained in these cases revealed that these dermoids usually began as a small nodule or papule, white, reddish, or dark blue Later, there often became visible the orening of a smus, which might or might i dıs charged schaceous material region, aside from slight and gracause no discomfort I he ma become infected and periodical



in the midline at the base of the columella.

swelling redness and pain as well as a puru lent discharge

The 2 dermoids involving the base of the columella and upper lip also were apparent in early infance, 1 at hirth. In both cases a sinus from which schaccous material discharged was present. In 1 of these cases the tumor gave the patient no trouble until he was 45 years of age (Fig. 8).

A dermoid of the septum in the case of a boy was of special interest because the tumor was associated with a congenital median cleft of the tip of the nose, columella, and upper lip There was a marked tendency toward re duplication of the nose. When the patient was 7 weeks old primary closure of the cleft was effected by his family physician Thirteen years later the boy registered at the clinic to undergo further surgical treatment to improve the cosmetic appearance of his nose. During a plastic procedure to correct the residual deformity a dermoid cyst as encountered in the just above the ella It was fħn measured imately r 5

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Fig 9 Dermoid cyst of floor of mouth and submental region

attached firmly to the underlying periosteum, but also have a tract or sinus of dermoid tissue that extends down between the nasal bones into the septum. When adherent, it is well to excise a portion of the periosteum in order to insure complete removal of the cyst. A tract between the nasal bones that extends deep into the septum offers a troublesome problem, as attempts to remove the surrounding bone and excise the tract result in much deformity. When excision is inadvisable, such a tract often may be removed by light cauterization with diathermy, a current of insufficient strength to cause sequestration of the adjacent hone being used.

DERMOID CASTS OF THE FLOOR OF THE MOUTH AND IN THE SUBMENTAL AND SUB-MANILLARY REGIONS

As pointed out by Colp, the mylohyoid muscle, which serves as a diaphragm between the mouth and the neck, separates dermoids of the floor of the oral cavity from those occurring in the submental and submavillary regions. When large, such cysts in the floor of the mouth bulge into the submental region, although they still are situated above the mylohyoid muscle. On the other hand, large submental and submavillary tumors push this

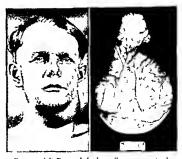


Fig to a left, Dermoid of submaxillary region extending into the floor of the mouth, and b, specimen removed at operation

muscle upward in the floor of the mouth. We have seen 2 cases in which the dermoids originated in the floor of the mouth, but with gradual growth penetrated the mylohyoid muscle, passed between its fibers, and appeared in the submavillary region. In 1 of these cases, a constriction formed by the diaphragm muscle could be seen at the junction of the upper and middle thirds of the cyst. This cyst measured about 10 by 7 centimeters.

At the clinic, 13 dermoids have been encountered above the mylohy oid muscle in the floor of the mouth, 9 below this muscle in the submental and submaxillary regions, and 2 passing between the muscle fibers of the mylohyoid muscle to involve the submaxillary region as well as the floor of the mouth

The youngest patient in this group was 11 years of age, the oldest 59, the majority of these patients were operated on when between the ages of 15 and 35 years. In contrast to nasal dermoids, only 2 of this group of 24 tumors were present at birth, 1 was noticed in infancy and the 21 remaining first became evident when the patients were between the ages of 9 and 59 years.

The majority of these cysts occur in the midline and are elongated rather than round in shape. They varied in their greatest diameter from 4 to 10 centimeters, the average

diameter being between 6 and 7 centimeters. These cysts were remarkably free from hair, us in only 4 of the tumors was any hair to be found.

According to the histories obtained in these cases, the greater number of the patients bad noticed a lump or swelling either in the floor of the mouth or below the chin for days. months, or even years before other symptoms occurred In 2 cases however the patients were at first entirely unaware of the presence of a swelling, being conscious only of impaired articulation when speaking. In a few cases the swelling appeared suddenly and this prob ably was caused by infection. In a such case, in which the tumor involved the right submaxillary region and bulged into the right side of the pharynx it was incised for a pen tonsillar abscess Several of these dermoids became infected resulting in periodic attacks of acute inflammation with swelling, the cysts became very tense and ruptured either into the mouth or externally

When these cysts swell to large proportions, either in the course of their natural growth or through infection the tongue is often pushed upward against the palate, this causes difficulty in articulation mastication, and deg lutition. While dysphagia and dyspinea occur rarely, they are at times serious.

On examination of these patients, a swelling may be seen in the floor of the mouth or in the submaxillary or submental regions (Figs 9 and 10). The tongue was often found to be pushed upward, in 1 or 2 cases to such a degree that it was impossible to obtain a view of the pharvny. On palpation these cysts had the characteristic dough; feeling. Some were rather soft some tense and in some, fluctual tion could be elicited. In a few cases a sinus was present which discharged sebaceous or purulent material, either externally or into the mouth.

Dermoids in the floor of the mouth or in the submental and submavillary regions must be distinguished from ranulas, cystic hygromas, cysts of the thy regionsal duct, chrome suppurative infections of the submavillary salivary gland, branchial cysts, lipomas and neurofibromas. The one notable feature which distinguishes a dermoid in these regions from the before mentioned conditions is its "putty-like" or "dougby" feeling on palpation

Extirpation of dermoid cysts above or be low the mylohyoid muscle is the treatment of choice The smaller tumors, which are definitely situated above this muscle, can best be removed through the floor of the mouth A midling incision is employed which not only makes for a minimum amount of bleeding but entails the least amount of trauma to the sur rounding tissues. After a line of cleavage is established, the cysts are removed by digital or blunt dissection. In some instances in which there is excessive scarring about the tumors, which is caused either by previous attempts at removal or by infection, excision is very unsatisfactory. In such cases the tu mor may be destroyed by cautenzation of the lining by diathermy

Large dermoids of the floor of the mouth that bufge into the submental region, and below the myloby oid muscle, can be excised through an incision in the submental region. In the submanillary region the cysts are best removed by means of a transverse incision parallel to, and just below, the borizontal ramus of the man dible

OTHER DERMOID CASTS ABOUT THE HEAD

As previously described, all but one of the dermod cysts in group IV (Fig. 3) were stitled at or near the midline. Four cysts in the suprasternal fossa ranged from 2 to 5 cent meters in diameter. Aside from gradual growth, they produced no symptoms other than occasional attacks of dyspnea and choking.

Year the midline in the larryngeal region 5 dermoids were encountered. With the exception of 1 which intermittently discharged a thin vellowish material none of them caused the patients any disconfiort. Yo smus leading to the pharynx from any of these cysts was found, although such cases have been reported in the literature.

Two dermoids occurred in the occipital region. In each case the cvst was present at hirth. One reached a size of 8 by so centil

meters and the patient thought it caused severe headaches, the other was small but had a sinus which penetrated the skull

The other cysts in this group were of no particular interest other than because of their situation to which reference has previously been made All of these cysts were removed by excision

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A STUDY OF OSGOOD-SCHLATTER DISEASE

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SGOOD in 1903 and Schlatter in 1908 described a lesion of the tibial tubercle which bears their names and is generally recognized as a distinct clinical entity. Since the original articles were published many observers have attempted to expound the etiology, pathology, and treatment of the condition.

ETIOLOGY

Evidence is presented in the following paragraphs to demonstrate the causation of the lesson. For the most part the data used are derived from a series of 24 cases of typical Osgood Schlatter disease which were seen personally by the author. There were 40 lessons in these cases. The source of other data is mentioned in the discussion. The 24 cases were studied by interrogation, physical examination, and roentgen-ray examination.

Many writers mention that rickets plays a role in the production of the lesion, yet in this series of cases there were none who had any of the cranial, thoracic, or long bone changes which follow rickets—Likewise, the parents in nearly all cases stated that the patients had received anti-rachitic diets and medication in early infancy

In no case had there been an acute infectious disease preceding the onset of the lesion, except that one case had an acute respiratory infection 2 weeks before the beginning of trouble in the knee. In 17 cases the tonsils and adenoids had been removed years prior to the onset. It must be assumed then that neither

From The New York Orthopaedic Dispensary and Hospital

acute infectious diseases, respiratory infections, nor infected tonsils bear any relationship to the condition

Although all of these patients were asked specifically concerning pain in other areas of the body where osteochondroses are common, yet in no instance was there a patient who had ever had symptoms in these locations, and none had any physical evidence of such osteochondroses. In this series it would seem that the lesion is unassociated with osteochondroses in other areas of the body.

One patient was an obese person, another was undernourished, the remaining patients were of an average type, indicating that abnormal physical type had no bearing on these lesions

A familial or hereditary tendency does not appear established in the etiology of the lesion, as there were only 3 patients with a familial history and none with a hereditary history

Bursitis anterior to the tibial tubercle has been claimed by some to be the cause of the lesion. Evidence that this is not true is presented by the dissimilarity of the roentgenogram of a bursitis and that of Osgood-Schlatter disease. Figure 1, a, is a lateral roentgenogram in a case of bursitis, and Figure 1, b, is of a case of Osgood-Schlatter disease. In the former the soft tissue swelling does not involve the tendon but lies anterior to it, extending to the skin shadow, while in the latter the swelling is entirely confined to the patellar tendon, the interval between the tendon and the skin showing no swelling. This



Fig 1 Roentgenograms illustrating the type of swelling in bursitis, a and of O-good Schlatters disease b
Fig 2 The type of swelling anterior to the tibial tubercle in cellulitis

evidence, as well as the fact that in 12 tubercles operated upon there was no evidence of a bursitis would lead one to the conclusion that inflammation of the bursa antenor to the tibial tubercle is not a causative factor in this disease.

A local infection at the tubercle or in close proximity to it has been stated as the etiological factor We fail to agree with this view The roentgen ray appearance of such a lesion is unlike that of Osgood Schlatter disease Figure 2 is a lateral roentgenogram of a case of cellulitis anterior to the tibial tubercle in a child The soft tissue changes are entirely different from those found in Osgood Schlatter discase There is no patellar involvement, nor are there any tubercle changes. In view of the dissimilarity of the roentgen ray appear ance of these lesions and since there was not a positive wound culture of all lesions from which culture was taken we feel that local infection plays no part in the production of this disease

ETIOLOGICAL FACTORS

Osgood Schlatter disease manifests itself at the age of puberty. This is the period of life when an individual's yearly increment in both ponderal and linear growth is the greatest. In early childhood there is a rapid linear growth, which is followed by a period of slower growth after the age of 3 years. Near the age of 12 years—in femals a little before this—there is again a period of very rapid linear and ponderal growth. This stage extends through

adolescence
Linear growth takes place mainly in the lower extremities, and, according to Digby the upper and lower femoral and the upper tibial epiphyses contribute 23½ inches to the average complete linear growth of an individual. In comparison with the epiphyses in the upper extremity, those of the lower limb which have been mentioned grow more and at a much more rapid rate than do any other in the body and their most rapid growth takes place during the period of adolescence.

Muscle and tendon groath Linear growth of a muscle which is already formed is a re sponse to traction everted upon its origin and insertion. In other words, the rate at which a given muscle grows is controlled by the rate of growth of the bones to which it is attached The muscle becomes stretched by epiphyseal growth, lengthens accordingly, and keeps lengthening until epiphyseal growth has been completed.

A tendon which is already formed lengthens at the expense of muscular substance, whether it be from the muscle tissue or from the connective tissue elements of the muscle In order to determine the extent of linear growth of the patellar tendon, the author selected lateral roentgenograms of the knees of 10 normal individuals, all of whom were at the age of adolescence, and on whom lateral roentgen-ray examinations were made covering a period from 1 to 7 years between the first and last examination The manner of measuring these tendons is shown in Figure 3 The length of the tendon was measured from the lower tip of the patella to a point on a line erected perpendicular to the axis of the fibula at the most superior point of that bone. The distance between E and Γ in Figure 3 denotes the length of the tendon The results of these measurements were as follows There was a 3 millimeter increase in the length of the patellar tendon in one tendon in 5 years The remaining tendons showed either no increase, less than 3 millimeters, or an actual decrease in length between the first and the last ex-This would indicate that the aminations patellar tendon does not lengthen, or lengthens an infinitesimal amount, during the active growth period Linear growth of this muscle tendon complex must occur from the quadriceps muscle and quadriceps tendon

The quadriceps muscle This is one of the most powerful muscles in the body Its origin is extensive, including the pelvis and a large portion of the surfaces of the femur The area of ongin is greatly out of proportion to the area of insertion, i.e., the tibial tubercle and expansions from the tendon to the tissue over and on either side of the tubercle The muscle unit having the origin and insertion which it has is stimulated to grow in length by the tbree fast-growing epiphyses which have been mentioned In response to their stimuli, the muscle tendon unit is placed in a greater degree of physiological tension during the age at which this disease appears than at any other period of life The origin of the muscle is so extensive that tension is diffused, and therefore slight or no pathological process develops The same tension is also transmitted to the area of insertion and, this being small, the

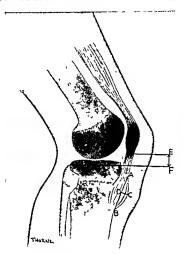


Fig 3 Diagram illustrating the manner of measuring lendons used in this article

stress is great Pathological changes may be produced in this structure and the tendon and its attachment thereby rendered more susceptible to injury

Trauma Direct trauma to the region of the tibial tubercle was claimed to be the initiating factor in 11 of 40 lesions studied Indirect trauma, such as running, jumping, or excessive walking, was stated as a preceding factor in 8 lesions, while of 19 lesions the patients or parents were unable to relate any antecedent trauma. Two of the patients were unable to give an accurate account as to the presence of trauma.

The fact that many of these lessons were initiated by either direct or indirect trauma seems to indicate that this plays some rôle in the etiology of the disease, yet the percentage of lesions, 47 in this series, which appears with no known trauma would lead one to feel that



in either tendon

Fig. 4. left. Illu tration of the tendon swelling the first reentgenological evidence of O-good Schlatter's disease right and swelling with calcification left trauma is not the ultimate causative factor

Sixteen of the patients had hilateral lesions

patellar tendon attachment These blood ves sels perforate the thin cortical substance of the tubercle Little or no blood is supplied to the tubercle from the duaphysis of the tibia until after bony union between the two has taken

Fig 5 Later roentgenograms of the knees of the same

patient hown in Figure 4 Large bone islands are present

66 per cent of the entire series. It is moon cervable that traumatism alleged to have caused the lesson in one knee would have af fected the other knee at the same time in any thing like this percentage of cases. This is strong evidence that the role of traumatism is to aggravate or call attention to the lesson rather than to produce it.

place hecause the epiphy seal cartilage of the tubercle acts as a harner.

If the patellar tendon and its attachment are altered from the normal, and if the blood vessels within these structures are changed the tubercle of the thin may be altered and the changes take place within the tendon which one generally asymbes to Oxygod Schlatter dis

Significance of Hooke's law in Osgood with the discase According to Hooke's law, Wertheim gives the moduli of a number of substances in grams weight per square cent meter. He states that elastic filtrous tissue arteries and veins have a more marked decrease in strain stress than do substances such as bone or tendon tissue which are melastic Stresses which are applied by the quadriceps muscle will cause an initial damage to the elastic tissues of the tendinous attachment of the patellar tendon as well as the small vascular channels within the tendon and the attachment hefore damage takes place within the bone.

changes take place within the tendon which one generally ascribes to 0-good Schlatter disease. Seasonal influence on Osgood Schlatter disease. A significant finding in the series of cases studied was the fact that in only one had the lesion manifested itself during the summer months of the year. Twelve patients

Blood supply to the trival tubercle Until the thinal tubercle has united with the di aphysis of the tihia its blood supply is fur nished partly hy the epiphysis of the tihia but to a greater extent hy the overlying network of blood yessels supplied hy the tissue of the

ease A significant finding in the series of cases studied was the fact that in only one had the lesion manifested itself during the summer months of the year. Twelve patients stated that disability had started in the fall, and in 4 cases, the onset of disability had been in the winter, while 4 other patients began to have trouble in the spring. Three patients were not able to give an accurate enough history as to the season of year when disability was first noted.

This striking seasonal influence on the on set of disability from this lesion might be ex plained by the fact that these patients are more active in the spring, summer and fall months, as well as that more rapid growth

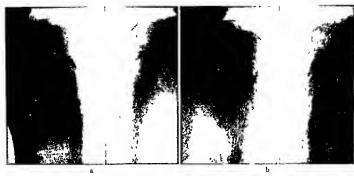


Fig 6 a Appearance of fragmentation which is often present in the tibial tubercle b, Disappearance of fragmentation with repair c, Repair complete

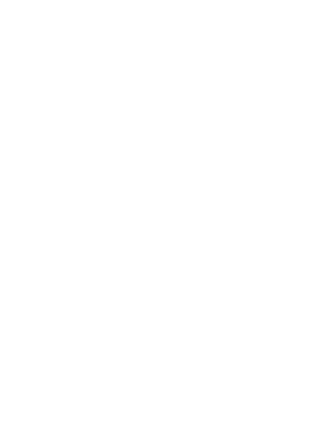
takes place in summer The seasonal increase in growth and activity may be the basis for abnormal stresses which are placed upon the patellar tendon and which will gradually increase toward, the fall If a pathological process of the tendon is started it may be weeks or even months later that the child has symptoms

ROENTGENOGRAPHY OF OSGOOD SCHLATTER DISEASE

Tendon enlargement This is the earliest roentgenological finding in this disease Figure 4 are shown the lateral roentgenograms of a patient's knees. This patient, Case I in the series, entered the clinic at the age of 13 years complaining of pain over the tibial tubercles, of 3 years' duration Neither direct nor indirect trauma had initiated these lesions The roentgenogram shows enlargement of the tendon on either side but with no tubercle changes or calcifications within the tendon on the right Neither of the tubercles was hooked Figure 5 shows the same case 2 years later The tubercles were slightly enlarged and there was a large bone island in each tendon Each tendon still shows a marked degree of enlargement Other similar roentgenograms could be shown to substanti-



ate the fact that tendon enlargement precedes other findings which are noted in roentgenray examination of this lesion. The fact that in many cases one is unable to elicit trauma as an initiating factor in the lesion indicates that the disease can occur without trauma, and may occur as the result of intensified physiological strains which are placed upon the tendon and its attachment. As will be mentioned later, the enlargement of the tendon is a constant feature in this lesion, and, also, the enlargement may involve the entire tendon.





Schlatter's disease Fig 10 Pre operative roentgenograms of patient's knees from which specimens were

taken, which are described in the article

and the tubercles have the appearance of fragmenting Figure 6, b, shows the same knees 6 months later The architecture of the tubercles has become more regular Roentgenograms of the same lesions 5 years after the first were taken (Fig 6, c) show that the tubercles have united with the shaft of the tibia, the architecture of the tubercles is normal in appearance, and each tubercle is enlarged

Ossification of the tibial tubercle is not essential in the formation of this disease, although in nearly all cases the tibial tubercles were ossifying The patient in Case 4 in the series was a boy aged 12 when he entered the clime for the first time. He had struck his right knee 3 weeks before admission. His complaint was pain about the tubercle Later in the same year he started to have pain over the left tubercle The trouble on this side had started gradually and without any obvious cause Figure 7 shows the roentgen-rays of this patient's knees on admission, a, and two years later, b The former shows a moderate amount of tendon enlargement on the right with slight calcifications within the tendon at its attachment, and the tubercle just starting to ossify On the left the tubercle was not present, but there was slight tendon enlargement, an indication that the disease would eventually cause symptoms on this side. The later film shows the usual x-ray findings in both sides, and the tubercle has appeared on the left

As a result of operative interference complete and permanent dissolution of the tibial tubercle can occur The first case in the operative series illustrates this. The tendons on both sides were split longitudinally, drill holes were made through each tuberele to the tibial shaft, and bone pegs were placed within these holes Figure 8, a, shows the lateral roentgenograms of this patient's knees before operation, while b, represents the roentgenograms 2 years later In the latter the tubercle on the right has entirely disappeared, while the one of the left is quite regular and normal, and the degree of tendon enlargement can be seen to be lessened This patient was entirely relieved of disability a few weeks after operation The case not only proves that the tubercle can disappear as a result of operating but also indicates that the tubercle is not essential for the maintenance of normal function of the quadriceps muscle A logical explanation of the dissolution of the tubercle in this case is that as a result of the operation circulation to the tubercle was altered

Calcified and ossified islands After enlargement within the patellar tendon has taken place, secondary changes may occur in the form of calcifications After the small areas of calcification appear one is able, in later roentgenograms, to see ossification occurring where there was a previous island of calcification In Figures 4 and 5 this is well illustrated Figure 4 shows the enlargement of



Fig 11 Photomicrograph showing the specimen taken from patient whose rountgenograms are shown in Figure 10 Specimen came from right side ×8

either patellar tendon with a small area of calcification on the left, and with neither calcinication nor ossincation on the right Pigure 3, a later roentgenogram shows large bone islands in both tendons, the one on the left occupying the position of the calcified area in Figure 4, while on the right a bone island is present where neither calcination nor ossification was visible before. Calcified iton in this lesson must have occurred as the result of pathological processes within the tendon. Following this these areas are converted to switch islands:

Bone islands within the tendon may disappear but in some instances they remain. Figure 9 is a luteral roentgenogram of a patient, 24 years of age, in which one can see the large ossithed islands as well as the marked irregularity of the tubercl. The patient had entered the clinic at the age of 16, when a clinical and roentgen ray diagnosis of bilateral Osgood Schlatter disease had been mide. It this time only smill calcined and ossibed islands were noted by roentgen ray.

PATHOLOGY OF OSCOOD SCHLATTER DISEASE

In the discussion of this phase of the disease three specimens will be described. Two of these specimens are from one individual, a boy



I ig 12 I hotomicrograph showing the tendinous attach ment in the normal

of 15 years, who complained of trouble in both knees 8 months prior to the time operation was done. The onset of trouble was without any known trauma Roentgenograms of this patient's knees are shown in Figure 10 On the left side the patellar tendon is enlarged and there is a small calcified area within the tendon near its attachment to the tilial to bercle On the right side tendon enlargement is seen, and also a large bone island is present within the tendon. On the left side a sagittal section was removed in such a manner as to include the tendon, the tuberele, and its carti lage, and a portion of the diaphysis of the tibia. On the right side a section was removed including the bone island. Tigure it shows the section taken on the right. Not only can the bone island be seen within the substance of the tendon, but it is entirely within the tendon. The tubercle is seen on the lower side of this specimen

In figure 12 is shown the manner in which the patellar tendon attaches to the tuberde in the normal. This specimen was removed from a patient aged 13 years. The tendon was composed of fibrous tissue arranged in an ordedy manner, with the attachment to the tuberde being relatively smooth and regular. The tendon fibers were closely packed to gether, with few blood vessels in the substance of the tendon at the attachment to the tuberde. The number of cells was not in creased above the normal of tendon tissue, and no fibrocartilaginous areas were present within the tendon or at the attachment.

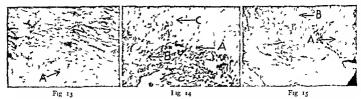


Fig 13 Cartilaginous areas within the tendon, A Note the irregularity of tendon fibers ×82

Fig 14 The junction of the tendon with the tubercle in a case of Osgood Schlatter's disease 1, Denotes the junction, B, the cellular bone of the tubercle and, C, de

In the case of Osgood-Schlatter disease the tendon fibers are arranged rather loosely and with spaces between fibers and with areas of fibrocartilage within the substance of the tendon, as is shown in the photomicrograph illustrated in Figure 13 The degree of vascularity within the tendon itself is also moderately increased

The attachment of the tendon to the tubercle is very irregular, and, instead of tendon fibers passing directly to the tubercle as is seen in the normal, there is an area of fibrocartilage between the tendon and the tubercle. This might account for the increase in size of the tubercles in this disease as later this cartilage becomes ossified. There is a marked increase of cells at the attachment of this fibrocartilage with the tubercle as is illustrated in Figure 14, and plasma cells, lymphocytes and young fibroblasts are present. There is a great increase in the degree of vascularity at the junction of the cartilage with the tubercle.

As has been mentioned before, the islands one sees in this lesson are within the tendon Microscopically the bone constituting these islands is more cellular than normal bone. About the margins of the bone itself there is a definite zone of fibrocartilage as can be seen in Figure 15, from which the bone is being formed. The tendon about the area of fibrocartilage is very vascular and cellular. Near the bone island, in one place, an island of fibrocartilaginous cells was found, in the matrix of which the presence of calcification was noted (Fig. 15).

notes the area of fibrocartilage described in the article ×82

Fig. 75. A photomicrograph of a portion of the bone island shown in Figure 27. Area of calcified cartilage, A and fibrocartilaginous ring about bone island, $B \times 82$

CLINICAL STUDY

One hundred and thirty-six patients with Osgood-Schlatter disease entered this clinic between the years 1923 and 1933 Twentyfour of these patients with admission and follow-up roentgenograms, were seen by the author Twenty-two of these patients were males and 2 were females. The average age on admission of the former was 13, the eldest being 10 and the youngest 10 The 2 females were aged to and it on admission. Of the entire series of patients with this disease seen at this clinic nearly all the females were much younger than the males This fact might be explained by the more rapid increase in linear growth in females, thus leading to the presence of the lesion at an earlier age in females

The symptoms complained of by patients suffering from this lesion are well known Pain over the tibial tubercle when walking, with an increase of pain on running or climbing stairs, is one of the most constant symptoms Perhaps the most important symptom is the disability which these patients experience when they endeavor to carry on athletic activities The degree of athletic activity was not severely limited by symptoms in any of the cases of this series Moderate limitation was complained of by 16 patients, while 4 patients were slightly handicapped, and 2 had no limitation Two patients were limited in activities as a result of residual paralysis, due to poliomyelitis of the opposite extremity rather than to the lesson in the sound limb The percentage of patients with Osgood-Schlatter disease and with paralysis of the

opposite extremity is relatively high in this small group however, these 2 cases are the only patients with the two conditions in the entire number of patients with Osgood Schlatter disease who came to the climic for treatment.

In 16 patients there were bilateral lessons and 8 patients had unilateral involvement

TREATMENT

Nineteen of the patients were treated by various conservative measures which consisted for the most part of daily massage of the affected region limitation of activities and partial immobilization of the Line by are bandages. In no case was a cast used in treating these patients.

Five of the patients were operated upon and to these are added 4 others not seen per sonally by the author. In the o operative cases 12 tubercles were operated upon. In S of these the tendon was split in a longi tudinal manner reflected to both sides of the tihial tubercle and drilling into the tibial diaphysis was done. In 4 tubercles the ten don was not reflected the drill holes being made into the tubercle through small shts in the tendon In 4 instances the tubercles were pegged hy placing small bone chips in the drill holes. These chips were removed from the shaft of the tihia. All wounds were closed in layers with plain gut sutures to the deep tissues and running silk sutures to the skin Dr. dressings and flannel pressure bandages were applied to the operative area.

Stutues were removed from the wounds in o days. The patients were allowed up as soon as the sutures had been removed and they were discharged from the wards, 2 to 3, weeks after operation. In no case was there any postoperative complication. Daily mas eage of the affected area was begun as soon as sutures had been removed, and the patients were started on active knee motion at the same time.

anie in

CLINICAL FOLLOW UP

The average follow up period in the ron operative group of cases was 5 years, the shortest period being 5 years and the longest 10. Twelve of the patients were entirely iree.

from troable when they were seen in followup clime. The average age when disablint
had entirely disappeared was 14. The average
interval from the tirrie when these patients
started to have symptoms until they were
entirely relieved was 2 years and 3 months.
The longest period of disablity was - 1 years
and the shortest was 7 months. So cen of the
patients still had symptoms due to the leason
when last seen. The symptoms were very
mild usually being pain over the tuberdes on
kneeling or pain in the same area in strenuos
activity. Two of these patients were in their
early twenties, 2 in their late teers, and 3
were 13 years of age.

In the operative group of cases the average follow up period was nearly 3 years, the long est period being 5 years and the shortest t year. Seven of these 9 patients were entirely free from any symptom and the interval or time between operation and complete relief was from a to 6 weeks. Two patients con tinued to have disability of the same type as before operation 1 of them 2 year, the other 1 year after operation. Both of these patients were 16 years of age when last seen. In both cases drilling and bone-pegging bad been done. In one instance the tuberde had been drilled through small alits in the patellar tendon and in the other a long longitudinal whit of the tendon had been done.

ROENTGENOLOGICAL DATA OF CASES STUDIED Von-operative series. The tubercle of the tibia may be of varying degrees of enlargement following this lesson and in some cases there is no appreciable enlargement. Five tuberdes in the non-operative group of it were not erlarged roentgenographically on follow-up examination is showed a moder ate degree or enlargement o were slightly enlarged Two tubercles, poliomyelitis pa tients, are not included. Eighteen tuberdes had united with the tib al shart when seen on tollow-up examination the remaining tuber des had not united. Two patients with un united to berdes still had trouble in the region of the tuberdes the remaining cases in which the tubercles had not united were free or symptoms. This illustrates the fact that umon of the tuberde with the tibal shall is

not essential for the relief of symptoms Conversely, the fact that 5 patients whose tubercles had united with the shaft still had symptoms would indicate that union of the tubercle with the shaft does not cause relief of symptoms

Calcified or ossified areas were present in 19 non operative tendons on admission to the clinic. In follow-up roentgenograms there were 25 tendons showing these islands. A bone island was present in one tendon in the admission roentgenogram but had disappeared when the last roentgenogram was taken. Four tendons were without either calcified or ossified areas in both admission and follow-up roentgenograms.

Thirteen tubercles had the appearance of fragmenting in their first roentgenograms, while on the last examination none had this appearance

All operative cases Eight tubercles of the 12 which were operated upon were slightly enlarged, as indicated by the first roentgenograms. Nine of these were slightly enlarged in follow-up roentgenograms, I was severely enlarged and I moderately. One tubercle operated upon showed no degree of enlargement. This would indicate that operative work has little effect upon the future size of the tubercle.

Seven of the 12 tubercles had united with the tibial shaft in follow-up roentgenograms Four tubercles had not united with the shaft, while one tubercle had been entirely absorbed Two of these patients had symptoms on follow up examination Many of the operative cases bad roentgenograms taken at periods following their operations In them the tibial tubercle did not unite with the shaft for many months and sometimes years coupled with the fact that many patients were relieved in such a short period after operation, leads one to the conclusion that union of the tibial tubercle with the tibial sbaft is not necessary for the relief of patients suffering from this disease

Calcified or ossified islands in the tendon were a feature in 6 cases before operation, and at the last examination of these patients ro tendons showed areas of ossification. It appears, therefore, that drilling and pegging of these tubercles has no effect upon the disappearance of these islands, nor do the islands give symptoms, since many patients with them were without symptoms after being operated upon

TENDON CHANGES

The manner of measuring the patellar tendons is illustrated in Figure 3. Two places for measuring the total diameter of the tendon were taken. One place was immediately below the lower pole of the patella, and the other was at the superior margin of the tibia, or at A in Figure 3 In discussing these measurements the former will be spoken of as the patellar measurement, and the latter will be called the tibial measurement, of the tendon In order to determine the amount of enlargement in the anterior part of the tendon a point, A, was taken on the proximal anterior surface of the tendon where it was of uniform diameter Another point, B, was taken anterior to the shaft of the tibia where the tendon faded into the covering membrane of that bone These two points were connected by a straight line The distance D-C, from a point on the line to the anterior surface of the tendon, was measured. This denoted the maximum swelling of the anterior portion of the tendon, and will be spoken of as tendon swelling in the discussion

A series of 25 normal tendons was measured in the same manner. In this series the ages of the patients ranged from 8 to 19, a fairly representative series corresponding with the age at which this disease appears.

Normal series The average diameter of the patellar tendon, or the patellar measurement, was 57 millimeters. The narrowest tendon at this point was 3 millimeters and the greatest was 9. The average diameter of the tendon at the tibia, or the tibial measurement, was 57 millimeters. The smallest and largest diameters were the same as for the patellar measurement. There was no tendon swelling anterior to the line A-B in 20 cases. In 2 there was 2 millimeters of swelling, in 2 others 1 millimeter of swelling, and 1 had 3 millimeters of swelling, and 1 had 3 millimeters of swelling.

Non-operative series The average admission diameter of the patellar tendon at the patella was 7 milimeters, the minimum being 4, and the maximum 11 milimeters The average diameter at the tibia was 85 millimeters, with a maximum diameter of 15, and a minimum of 5 milimeters. The average ten don swelling anteriorly was 6 milimeters, the minimum being 2, and the maximum 9

c-IIn follow up roentgenograms the average diameter of the tendon at the patella was 7 millimeters, and at the tibia it was 6 The average amount of tendon swelling was 5 millimeters

ROperative series. The pre-operative meas urements of this group were nearly the same as those of the non-operative series. The average patellar diameter for this group in follow up roentgenograms, was 9 millimeters, and at the tibia the average diameter was 9. The average tendon swelling was 8 millimeters.

The above data indicate that the patellar tendon retains a degree of enlargement throughout its entire extent after the symptoms of the disease have subsided. There are, however, some tendons which return to a normal diameter. All of the operative tendons increased in diameter after operation.

SUMMARS

The relief of symptoms in series of cases by other observers who have operated upon these lesions has been attributed to the fact that the tubereles, by drilling and pegging, unite with the tibial shaft by premature bony or fibrous union. It has been proved by this series that premature bony union does not take place as a result of such operative procedures, as well as by the fact that a few patients were relieved of trouble without operation and before bony umon could have occurred A fibrous tissue union with the diaphysis of the tibia is also an illogical explanation of the manner of relief after these patients are operated upon The small amount of fibrous tissue which might con cervably form within the drill holes would hardly be sufficient to anchor the tubercle if separation had occurred Also, the fact that in many non-operative cases relief is secured by conservative means is evidence that this type of union does not occur Another proof

that premature union of the tibial tubercle is not a necessary procedure in reheving these patients is demonstrated by the fact that in one case of this series the tubercle entirely disappeared in a few months after operation, and yet this patient was reheved of trouble in a few weeks.

It is our feeling that the symptoms of which these patients complain are due to a swelling of the patiellar tendon and its attachment. The pathological processes which cause this swelling have been mentioned. By splitting the periterion and incising the tendon, intra-tendinous pressure is released. The tendon is theireby able to bulge through the moision, and the pain which is caused by increased pressure within the tendon is releved, much in the same manner as pain is releved when one incises an abscess.

Since this article was written three patellar tendons were split in two patients suffering from this disease. A complete description of these cases will not be given here but will be reported when more cases have been added to them. The two patients were discharged? weeks after operation and on their first visit to the clinic, 3 weeks after operation, they had no tenderness over the tibial tubercle, they carried on a normal file, and were entirely free of the disability present before they received treatment.

CONCLUSIONS

1 Rapid growth during adolescence is the underlying cause of Osgood Schlatter disease

2 During the period of rapid growth the quadriceps muscle is placed under greater physiological strain than at any other period of life. This increase of strain may produce changes within the patellar tendon which can be recognized roentgenographically. The tibial tuberde can be altered by these changes within the tendon because the blood supply to that structure is changed. The roentgenographic appearance of the tibial tuberde in Osgood Schlatter disease is based upon the altered circulation within the patellar tendon and its attachment.

3 Fibrocartilaginous areas appear in the patellar tendon in this disease, and they are the result of traumatisms within the tendon These areas become calcufied and later ossi fied, and these changes can be seen roentgenographically

- A The disability experienced by patients with this disease is due to an increase in intra tendinous pressure. Release of this pressure by slitting the tendon will relieve the indi vidual If conservative treatment is mun tained the peritenon adapts itself to the increased size of the tendon and eventually disability disappears
- 5 Conservative measures should be used in treating patients seen in the late stage of the disease. Slitting of the tendon is advised if patient is seen near onset of the disease

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ACUTE APPENDICITIS WITH PERITONITIS

Treatment and Mortality

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HE desire to contribute to the clinical care of serious cases of acute appendicitis with peritonitis, to describe the methods wherehy a low mortality has heen gained and to discuss other gener il surgi cal factors contributing to mortality percent ages has prompted this discussion

When we realize that a long known well understood, diagnosable, localized disease treated by recognized methods and curable, still carries a death rate of 1, 2 per 100 000 of population-that rate heing nearly doubled in the past 20 years - we must search for the cause of this mortality. Add to this the fact that, in cases with peritonitis, there is an operative mortality of 5 to 30 per cent for which the surgeon must accept a large part of the enticism we ask ourselves, where is the trouble?

In a case of abdominal pain, not only the larry but too frequently the physician suggests delay, catharsis, and the use of morphinethe arch enemies of the patient and when finally the patient reaches the hospital after a late diagnosis of acute appendicitis with peritonitis, a resident or junior inexpenenced visitant too often is assigned to the case. An abdominal pain should be considered appendi citis until otherwise proved and the most experienced surgeon available should operate unless another well trained in his methods is I M F Finney, Ir, produced statistics to show that the mortality in acute appendicitis complicated by peritoritis when handled by visiting surgeons was practically the same as that when the operations were done by residents. It seems to me that Fin ney's mortality rate as reported is too high and is the result of a wrong conception of treatment by both visitants and residents When a surgeon opens the abdomen on any diagnosis he should have the training to meet any condition found. If as Finney concludes,

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an incompletely trained surgeon can handle acute appendicitis with as low a mortality as that of the experienced surgeon, why all the painstaking methods to train surgeons and why should 3 to 7 or 8 years he required in such a training if the mortality and operative results in such a disease are not improved? Being thus burdened with principles, I op crated upon the patient or closely supervised operation in every case of this series

Group statistics determine general results only, it is necessary to study uniform individual methods practiced by an individual surgeon in order to appreciate results. The operation it.elf, although it may ruin the patient's chances, may still he but a part of the cause of mortality and any one of the three stages-drignosis, operation, and postopera tive care-may improve or ruin the results Each surgeon may plan his technique, partly from group statistics, but, as in the present problem, he must have as well his own well

grounded conceptions of pathology, diagnosis

course and treatment

In the period from 1913 to 1923, the author treated in Cleveland City Hospital 156 pa tients with appendicitis with gangrenous or ruptured appendices, patients with well marked peritonitis requiring drainage. This hospital had, at that time a capacity of about tooo beds and received the usual run of pa tients with advanced or neglected disease who so to such institutions. In the histories there were commonly mentioned not only delay but the use of catharsis and morphine This series included all such patients admitted during the same a winter months for to years thus making a good cross cut of appendicitis or currence and removing the factor of a favorable series. The group includes all serious cases of acute appendicitis with peritonitis re quiring drainage, but it does not include the large number of cases of acute appendicitis not requiring drainage, or subscute or recur

ring appendicitis, or cases in which appendictomy was done during an abdominal operation for other causes. In these so called clem appendectomies, there were no deaths due to the operation.

During this period in 4 other hospitals, there were in the author's service 61 of the same class of cases, making a total of 217 cases of acute appendicitis with peritonitis requiring drainage. In these two groups totaling 217 cases, there were 5 deaths, a mortality of 184 per cent.

Closure of the abdomen in the presence of pus with peritoritis, in our judgment, is bad surgery, so that this series includes no such case but only those in which our judgment

dictated drainage

How have the results in this series of cases been gained? In a search for the causes of the higher mortality, some simple surgical principle may inadvertently be overlooked. For this reason, early in our practice we adopted

certain rules of procedure

Immediate operation in every case on the diagnosis of appendicitis. No possible excuse -professional, social, holiday, or other engagement-was permitted to break this rule At times this has resulted in some privations, but it has been followed. We are well aware of the old Ochsner treatment delay in certain advanced cases to permit the localization or walling off of an abscess or the building up of immunity, the excuse that the patient is not suitable for operation or that other diseases may be present, the question of age and intercurrent disease. We have come to believe that such factors are negligible and that operation should be done at once on diagnosis. In some cases, simple incision and drainage may be all that is indicated but immediate operation is the procedure of choice Local anesthesia. infusions of salt solution before, during, and after operation together with the Alonzo Clark postoperative care make immediate operation in all cases the safest procedure. Delay is common enough before these patients are seen b) a competent surgeon Why should the surgeon delay still further? While the practitioner or consultant has his attention focused to find the relatively few cases which he considers as suitable for late operation, delay becomes the custom and the fatal complications develop. A questionable delay held as best in a few cases further jeopardizes the many Agim those few patients, say to per cent, in which it is claimed delay in operation will enable resistance to develop or walling off to occur, will not be harmed but will be benefited by an accurate, non-shock producing operative procedure which, with the slightest trauma, reheves the source of peritoneal infection.

TECHNIQUE

Inestlussa Nitrous ovide gas and oxygen with ether if necessary has been the routine anesthesia. In tovic cases and in those complicated by other serious disease, e.g., pneumonia, heart conditions, local anesthesia by block and infiltration has been used

Routine: A ruptured appendix may present one of the most difficult, nice operations of the abdomen. Localization and access to the appendix, prevention of contamination of loops of small gut, non-disturbance of the gut, delivery of the appendix without rupture or further spread of infection, when, how, and what to use as drainage, respect for the peritoneum, the non disturbance of intrapertioneal pressure—all these steps present their problems. The delegation of a "pus appendix" to any but the best experienced available surgeon is wrong, yet this is too frequently the custom. I amiliarity breeds contempt.

1 salme infusion, either subcutaneously or intrivenously of 1000 to 1500 cubic centimeters was given to adults (children in proportion) before or during operation. A short, 3 inch or less, intermuscular incision was made The old practice of walling off with gauze tapes or rubber dam we have never practiced since it seems perfectly obvious that pus and infection are thereby carried into the areas we wish to protect and thus brought into contact with loops of small gut Likewise bulging of loops of small gut into the wound was prevented, possibly by having a very few inches of gauze always visible in the wound Through the small incision pus or seropus escapes or is sucked The cecum or loop of small gut tends to present into the wound, thus partially closing the peritoneal cavity without changing the normal intra abdominal pressure Inspec-

tion or exploration is never attempted. Knowing that about 66 per cent of appendices are retrocecal or retrocohe, the surgeon passes the exploring index finger first lateral to the cecum where in these cases it encounters the familiar feel of the thickened appendix and inflammatory tissue, or be guides the finger along the trough over the that vessels where the pelvic appendix is found in 31 per cent of cases In both situations the cecum is displaced toward the midline, the appendiceal mesentery and appendix being carefully handled Rough handling of the appendix or cecum does not occur and the danger of pyle phlebitis is prevented. Thus we have neither carried infection elsewhere nor sought to de termine the extent of the peritonitis. If we are able to state accurately that a general peritonitis is present we have markedly re duced the patient's chance of recovery

The appendix may be simply ligated or preferably by means of a double purse string suture, inverted if the condition per mits but never both. In one early case of simple, appendictis not here included, in which ligation and purseiting suture were both practiced, an abscess developed between the ligation and the inversion and required a secondary operation. In 4 cases only, the appendix was not removed. When a ruptured appendix to left and dramage is established then, is a constant potential or active reinfection of the bentonities.

Drainage A very old problem II hat is earned by closure of the abdomen based purely upon unsubstantiated theories of peritoneal resistance, except a risk! Recent statistics by Bruer, covering a very large group-1000 cases of appendicitis with peritoritis closed without drainage -- still gives a mortality too high for such cases Limitation of the exten sion of infection by drainage seems always in dicated Reverse lymph flow of whatever duration (Horsley) aids in such an elimina tion If the lymph current is reversed, as when stimulated by a foreign body better chimina tion occurs and better localization. At least until there is available an efficient perstonitic serum or vaccine the peritoneal abscess should be drained as any other abscess. While we are

studying by clinical experience the possibil ities and in what conditions the peritoneum may be closed, the general mortality goes up It has been our custom to drain in all such cases A drain is always placed deep into the pelvis. One may also be placed to the stump of the appendix or retrocacally, or, in the worst cases, on the left side into the pelvis Care should be exercised that the drain does not press upon the large vessels, ureter, or loop of gut Erosion of vessels (2), vein (1). arters (1), tube on a loop of small gut (1), have been seen. Cigarette drains and rubber ussue, easily collapsible by muscle or suture pressure, are worthless, if evacuation is desired. I have seen an instance of fatal residual abscess due to a cigarette drain acting as a plug Reasoning that a drained cavity be comes walled off within 24 to 36 hours and that therefore the drain may be safely removed, several times after removal of a drain we have seen the abdominal wall and slin seal thus causing a residual abscess requiring drainage. Therefore until the temperature has touched normal and the patient is out of danger we have in all drains, loosening or shortening them from time to time

Drainage of periloneal abscess It seems entirely unreasonable to leave a collection of pus or seropurulent fluid in any part of the peritoneal cavity no matter what are the apparent resistance of the patient and the ab sorptive power of the peritoneum. The pa tient's resistance may be high. Why not use it as an advantage instead of an experimental attempt to had out how much he can resist if the peritoneum is closed? A fluid collection may become walled off, may become purulent. may form a focus for lymphatic extension venous thrombosis and extension, may very greatly increase in volume even to filling the left peritoneal fossa to above the navel as seen in a child of 7 years

Postoperative care The postoperative care begins even before operation. Intravenous saline glucose infusions of 1000 to 2000 cubic centimeters and morphine to the physiologic limit in one or two does if there is un acoidable delay before operation are given

The shell drain consists of a 1 cent meter motiched soft rubber tube with a know which of gause through it which gives both capillarity and tube space.

Pitressin has given sufficiently good results and is on a sufficiently proved basis to be used both before and after operation in selected cases. After operation nothing is given by mouth, but intravenous saline or saline and glucose, 4000 to 6000 cubic centimeters is given, every 24 hours, morphine is administered until respirations are 14 to 16 and the pupils are moderately contracted, gastric or diodenal lavage is used following vomiting or regurgatation—these procedures together with extreme vigilance and frequent observations to detect the first signs of trouble, constitute the invariable treatment.

My attention has occasionally been called by the resident to a rapid pulse, anytous factal expression, and abdominal distention as evidences of an extending peritonitis. Regurgitant type of vomiting, a little brownish stain to a handkerchief, to the corner of the patient's mouth or on the bed sheet, together with epigastric distention, tell the often overlooked story of fluid intake by mouth and a gastric dilatation which, if repeated lavage or continuous evacuation of gastric content is not carried out by a retained tube, may prove

fatal

Morphine without atropine results in a contracted tubular type of gut, it lessens or obliterates peristaltic waves (Sollmann), and through intestinal muscle contraction it gives support to and lessens the volume of the intestinal circulation Morphine, therefore, prevents intestinal circular muscle relaxation, vascular dilatation, increased blood supply, and increased retention of blood in the intestmal capillaries Increased blood content of the intestines results in diffusion of the blood gases into the gut with greater distention The gas producing group of organisms adds to this distention. It has been shown that this intestinal gas has about the same carbon dioude content as has expired air, hence the gut, in a condition of paralytic obstruction, acts in the nature of an expiratory organ At the same time, with this increased blood content, the toxins of obstruction which are the result of putrefaction of the intestinal content pass more freely into the circulation, thus furmshing the lethal tovernia of obstruction

Whether these toxins originate from micro-

organisms or from the intestinal contents as maintained by Brooks et al, whether they originate from faulty intestinal digestion or from intramucosal intestinal origin as maintained by Whipple et al , or whether they are the result of dehydration, is immaterial except as the origin affects the ultimate production of a serum. It is evident clinically that the typical toxemia is not apparent when there is no paralytic dilatation of the gut, when the gut is contracted as a result of morphine administration the toxemia of paralytic obstruction does not occur. In local peritonitis, when the gut is contracted and its vascular supply is lowered, there is but one group of toxins to combat, i.e., those coming from the peritonitis Therefore, before operation and immediately after operation, it is of great assistance if one can be assured of a contracted If this pre-operative and postoperative status has not been established, if there is present or there has developed a paralytic type of stasis of the gut with a tovemia of intra intestinal origin as well as a tovernia of peritoritis, the outlook is grave

In these difficult borderline eases in which the patient hovers between recovery and death, complications may often be foreseen and prevented if the physiological processes as affecting the patient in question are kept in Observations as to the volume intake and output of fluids-bearing in mind the amount of excretion necessary to eliminate a heavy toxemia—as to the conditions of renal excretion, as to the cardiovascular circulatory balance as to respiratory conditions, as to blood chemistry and consultation when problems as to heart, blood, and respiration arise. will keep the clinician alert to changing conditions of the patient Quick appreciation of the dry tongue and skin, the rapid pulse, the lessening of elimination, the distention, the restless discomfort, as well as many other indications to which the practicing physician, familiar with the physiological phase of medicine is aware, will often turn the trend to recovery

OTHER CAUSES OF MORTALITY

During the years between 1910 and 1930, approximately, there developed in the surgical



CLINICAL SURGERY

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HEMOSTASIS IN THYROIDECTOMY

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NLIKE the surgical treatment of most structures, the surgical management of the thyroid gland is not concerned alone with a low mortality rate but because of its rich blood supply it is also seriously concerned with the problem of hemostasis. The operative mortality in thy roid surgery is accepted at the present time as less than I per cent. This low rate is obtained whether the surgeon proceeds without any plan, excising the gland as he would any other tumor and ligating the vessels as they bleed, or whether he follows a careful technique based on the anatomy involved. The thyroid surgeon, however, must obtain a good functional and cosmetic result as well as avoid technical com plications, such as injuries to the laryngeal nerves, parathyroid bodies, and the occurrence of hemorthage. A technique aimed mainly at hemostasis will best accomplish this end because injury to the laryngeal nerves and parathyroid bodies occurs probably most often in the attempt to apply ligatures to the thyroid arteries and in the attempt to control hemorrhage which occurs within the capsule

The incision for thyroidectomy should be relatively straight and in patients with ordinary sized goiters it should be placed about one finger breadth above the upper border of the sternal ends of the clavicles (Fig. 1) In the patients with larger goiters, because of the resulting loose ness of the skin, the incision should be relatively higher to prevent "dropping" of the scar onto the upper chest The incision should go down to, and through the superficial layer of the deep cervical fascia thereby including the anterior jugular veins which are dissected back with the anterior flap After the bleeding in the upper flap has been controlled, the lower margin of the wound is undermined for a distance of about 2 centimeters. This important procedure prevents an "overhanging" of the skin of the upper flap after operation Inclusion of the superficial layer of the deep cervical fascia in the flap has the advantage of preventing ecchymosis of the skin in the thin patient and when the prethyroid muscles have been thus exposed without their fascial investments, they can readily be retracted without cutting (Fig. 2 A)

While ligation of the inferior thyroid artery may be accomplished within the thyroid space during or after the removal of the gland, we have followed the teaching of deQuervain and apply a ligature to the inferior thyroid artery before proceeding to an excision of the gland. The median border of the sternomastoid muscle is freed and drawn outward with a blunt retractor. The exposed fascia of the prethyroid muscle is now slit vertically for about 3 centimeters (Fig 2 A) The outer edge of the slit fascia is pared back gently and the finger is gently slipped down through the arcolar tissue mesial to the carotid sheath to the transverse processes of the vertebra. The inferior thyroid artery is readily felt at the level of the sixth cervical vertebra (usually marked by a small tubercle), as it emerges at right angles to the carotid sheath Exposure is quickly accomplished by placing retractors into the depth, with the outer retractor including the sternomastoid muscle, the carotid artery, vagus nerve, and jugular vein and the mesial retractor holding the prethyroid muscles and the thyroid mass (Fig. 2) B and C and Fig 3) The inferior thyroid artery is lifted from the prevertebral fascia with a blunt dissector and a linen suture is readily applied (Fig. 3), and at this stage of the operation the retractors removed

In the ligation of the inferior thyroid artery, during or after the process of resection, the ligature is seldom applied to the trunk of the artery, but more often to one of its branches, thereby endangering the recurrent lary ngeal nerve (Fig. 5) and naturally producing less hemostasis. Pre-liminary ligation of the inferior thyroid artery effects better hemostasis, which together with the more distant application of the ligature, offers greater safety to the recurrent lary ngeal nerves and parathyroid bodies.

The retractors having been removed, the excision of the gland is begun through the median separation of the prethyroid muscles. Since the



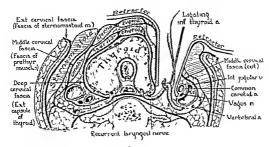
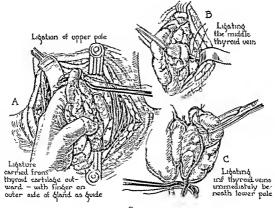


fig 3

sutured, the wound is held widely open and the patient is asked to strain. When the resection is done under gas aniesthesia the patient is awakened sufficiently to cause automatic straining. This will expose any hidden bleeding which is carel for at once. Two "pants drains" (split tube) ire placed down to the thyroid space through holes pierced in the fascia of the lower flip (1g. 7. V) and the superficial layer of the deep cervical fascia is closed with interrupted plain crigit

(Fig. 7 B) A running suture of fine plain catgut is placed in the platysma to approximate the skin margins, and the skin is closed with interrupted dermal suture and clips. For a good scar (a very important part of the operation) the clips, tubes, and dermal suture should be removed early

Stage operations still have a place in the surgery of the thyroid in spite of the employment of iodine in the preparation of patients with hyper thyroidsm Ligation of the superior thyroid



Tig 4

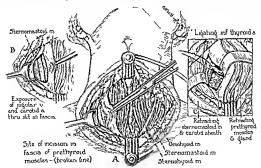


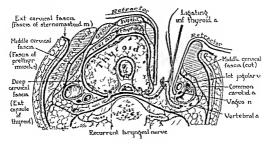
Fig. r. Collar incision through skin and fascia of prethyroid muscles

superficial layer of the deep cervical fasca has been dissected back with the anterior flap, it is possible to get sufficient exposure for excision of the smaller glands with the median separation the prethyroid muscles. In the large clands, it is advisable not to stretch these muscles too far since they tear easily. In such cases cutting of the muscles between clamps is best for good erposure. Before mobilizing the lobe it is well

after grasping it firmly with the tenaculum, to apply ligatures or clamps to the middle thyroid vein (Fig 4 B) and cutting hetween With this vem bisected, mobilization is more complete. The superior pole is next ligated by passing a carrier from within outward to include the pole en masse or the artery alone as desired. The ligature must pass around the whole pole and not through it (Fig 4 A) A similar ligature is applied to the inferior thyroid veins immediately beneath the lower pole (Fig 4 C) When this has been accom plished with both lobes, prehminary ligatures have been applied, as illustrated in Ligure 5, to (1) the inferior thyroid arteries "extrafascially," (2) the superior thyroid arteries and veins, (3) the middle and (4) inferior thyroid veins. The gland can now be resected deliberately with very little bleeding

Each lobe when revected is held firmly in the tenarulum and clamps are applied to the capsule (Fig. 6 A) to mark the cite of the incision before the removal of the gland. During the resection is well to have the assistant hold a inger under the outer row of forceps. This assists in the control of bleeding and more thoroughly everts the entire lobe for a clean dissection. Interrupted sutures of plain caigut are used to close the stump (Fig. 6 B). When there is a large median lobe present, it is resected the same as a lateral lobe or included in the re-ection of one of the other lobes. After the capsule of hoth lobes has been





Ing 3

sutured, the wound is held widely open and the patient is asked to strain. When the resection is done under gas anesthesia the patient is awakened sufficiently to cause automatic straining. This will expose any hidden bleeding which is cared for at once. Two "pants drains" (split tube) are placed down to the thyroid space through holes pierced in the fascia of the lower flap (Fig. 7.4) and the superficial layer of the deep cervical fascia, is closed with interrupted plain catgut

(Fig 7 B) A running suture of fine plain catgut is placed in the platy sma to approximate the skin margins, and the skin is closed with interrupted dermal suture and clips. For a good scar (a very important part of the operation) the clips, tubes, and dermal suture should be removed early

Stage operations still have a place in the surgery of the thy roid in spite of the employment of ordine in the preparation of patients with hyperthyroidsm Ligation of the superior thyroid

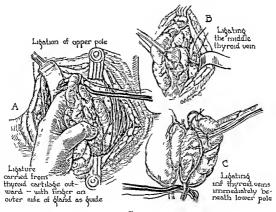


Fig 4



TABLE I - ANALYSIS OF CASES

Data	Under 48 hrs				72-96 hours		96- hor		220 hrs 7 days		8-10 days		Over 10 days		Total	
Number of cases	6		6		1		6		to		17		32		90	
Average age	48		5\$		46		23		42		45		48		47	
Average temperature	100 5		100	6	99 0		102 6		100 6		100 5		100 5		100 6	
Average leucocy te count	16 500		20	300	20	100	27 700		13	800	14	600	17 400		16 800	
	No	Per cent	No	I er cent	No	Per cent	\ 0	Per cent	No	Per cent	No	Per cent	10	Per cent	No	Per cent
Palpable mass	1	17	2	17			6	200	٥	47	0	50	15	47	41	46
Operative procedure Cholecy stostomy Cholecystectomy Cholecystostomy plus	š	83	6	100	3 2	75 25	6	100	13	60 21	ŝ	54 29	10 14	31 44	52 24	58 27
choledochostomy Cholecystectomy plus choledochostomy Choledochostomy only Simple drainage	1	17							2	\$ \$	2	6 11	6	3 19 3	7 1 4	8 I 4
Pathological changes Subacute or chronic Simple acute Hydrops Emprema Gaurene Perforation—abscess Perforation—gener alized peritoritis Stones present	1 1 1 6	17 17 17 17 17 17	7 4 1	17 66 17	1 2 1 4	25 50 25 100	3 2 6	27 50 33	2 3 10 1 2	21 16 51 \$ \$ \$ \$	4 2 2 5 3 1 16	23 12 12 20 18 6	5 4 2 12 0	26 12 6 55 28	0 12 8 37 5 15	10 13 0 41 6 17
Bacteriol gy Cultures taken Sterile Escherichia coli Streptococcus viridans No known pathogen Miscellaneous	3 2	66	6 2 3	33 50	4 I 2 I	25 50 25	6 2 3	33 50 17	14 4 8 2 1	20 57 7	12 8 1 1	65 8 8 8	23 8 7 6 2 1	35 30 27 4	68 27 24 8 4 3	40 35 12 6 7
Postoperative course Smooth Fau Stormy	5 1	83 17	4	66	2	50	3 2	50 33 17	25 3 3	68 16 86	13	76 6 18	21 4 7	66 12 22	61 11 18	68 12 20
Hospital days	21	<u> </u>	12	1	35		27	1	26		27		31		28	
Mortality	ļ —	1	1	27		1	1	1			,	6	3	9.4	5	3 6

By dividing the cases in the above manner we have two groups in which operation was performed during an acute phase of the disease—one relatively early, the other late, and a third group in which operation was performed in the interval after the acute manifestations had subsided

The statistical data of each of these three main groups is combined in Table II for comparative study

Let us now analyze each group more carefully in an effort to evaluate the results of early and delayed operation

PATHOLOGICAL CHANGES FOUND

Taking up first the 41 cases in which the patients had immediate operation—how many of them had irreversible pathological changes at the time of operation? There is, of course, some difference of opinion as to what should be classified as "irreversible pathological changes" Some authors

would include only cases of gangrene and perforation, while others would include the more virulent cases of empyema and simple acute cholecustitis It is usually impossible to tell at the time of operation whether the inflammatory process is advancing or subsiding, but there would seem to be ample clinical evidence to the effect that the conditions of empyema, hydrops, and simple acute cholecystitis do subside spontaneously as far as clinical signs and symptoms are concerned Perforation of the gall bladder with pericholecystic abscess is also known to undergo retrogressive changes in which the abscess becomes better walled off and more chronic in nature, with disappearance of clinical manifestations of disease Thus, the term "irreversible pathology" does not necessarily mean that the disease process is a progressively fatal one Including only the cases of gangrene and actual perforation, we have 11 cases, or 27 per cent of the group, in which in a strict pathological sense there were irriversible changes in the gall bladder wall. It is altogether possible that, had not immediate operation been resorted to, in a certain percentage of the 18 cases of empyema the condition would also have gone

on to gangrene and perforation

In the group of patients treated by delayed op eration we have already seen that in 18, or 35 per cent of the group, the condition failed to subside clinically to the extent that conservative therapy was abandoned and emergency operation per formed In this group we find a high percentage of cases with so called irreversible pathological changes, namely, gangrene or perforation with abscess formation (41 per cent) It seems logical to assume, therefore, that the 27 per cent of cases in the first group would also have failed to respond to conservative therapy In the face of these facts it would appear that about every third patient with acute cholecy stitis who has been admitted to this chinc has presented such extensive pathological changes that a subsidence of the clinical symp toms by conservative measures was not pos ible It is also of interest to note that of the 40 cases in the deliged group, only q patients, or 18 per cent, had subsided sufficiently by the time of operation to warrant a pathological diagnosis of subacute or chronic cholecystitis. This emphasizes the noint stressed in the literature that it is often impossible to predict the extent of the pathological process from the clinical undings (18, 25, 28, 29, 30) Of the 32 cases in which a satisfactory subsidence of clinical signs was obtained, operation revealed 12 with empy emas and 6 with pericholecystic abscess

It has been the dictum of the past to place per foration of the gall bladder among the rarries of surgical practice However, in recent years, much has been written to the effect that this complica tion is much more common than was formerly be heved (11, 13, 16, 19, 25 30) Our experience cor roborates this latter belief Of the total 103 cases reviewed in this series there were 23 with perfora tions or 22 per cent of the series. In the greater portion of these there was sufficient walling off to form a pericholecystic absiess. However, there were 4 cases with perforat on into the free peri toneal cavity and a generalized peritonitis (3.9 per cent) Thus, we see that the experience of this clinic with perforation of the gull bladder has been rather extensive, and about every fourth patient with acute cholecy stitus admitted to the clinic has shown this advanced pathological change

BACTERIOLOGY

Considerable work has been done on the bac teriological aspect of acute cholecystic disease and a number of writers bave emphasized the point that cultures of the pus from the empvena are often sterile (12, 20) Andrews, in a recent article, expresses doubt as to the evitence of true em pyemis he feels that in most cases of so called empy.ma the 'pus' is simply precupited cal

cium or cholesterol In our series of cases the bacteriological findings correspond fairly well with those reported in the hterature Cultures were reported as sterile in about 40 per cent of the cases in which they were taken Escherichia coli was the organism most commonly cultured, with Streptococcus viri dans in second place. No cultures of Bacillus typhosus were obtained. We are inclined to agree with Andrews in his build that in many instances the underlying lesson in acute cholecystic disease is vascular rather than infectious in nature and may be likened to a hemorrhagic infarct of the gall bladder wall. Impaction of a stone in the cystic duct is a very common finding in acute disease of the gall bladder and is undoubtedly a most

important etiological agent

Referring to Table II we see that in the na tients operated upon early there were sterile cultures in 30 per cent, while in those cases in which the condition was allowed to subside cultures were sterile in 57 per cent, an increase of 18 per cent It is interesting to speculate on the significance of this finding Possibly the period of conservative treatment was instrumental in allowing the infection to burn itself out suggested that the bile may be a factor in reducing the virulence of the organisms. On the other hand, it may be argued that the factor responsible for subsidence in these cases was a higher per centage of sterile cultures from the beginning. In favor of this view is the fact that in the group in which the condition failed to subside on conservative treatment there was the lowest number of stenie cultures obtained (20 per cent)

The incidence of gall stones in this series of cases in striking, there being only 8 cases in the total number reviewed in which no stones were tound. The incidence of stones was, therefore about 92 per cent. Common duct atones were found in about 7 per cut of the series.

MORT VILTY

The mortality figure for the entire group of cases was 5 6 per cent, a figure which corresponds favorably with other statitudes in the literature (1, 10, 21, 23, 27, 30)

In the group having immediate surgery there were 3 deaths, giving a mortality of 7 3 per cent for the group

TABLE II

	TVDT	E II							
	Group early o	having peration—	Group having delayed operation						
Data	Operated u	on during an	Sympton Operated u	ns subsided pon in interval	Symptoms failed to subtide Operated upon during an acute phase				
Number of cases		41		32	17				
Average age		41		45		54			
Average temperature on admission	1	00 6		ıg 8		or			
Average leucocyte count on admission	17	000	15	600	15 100				
Average delay from admission to operation	11 :	hours	7 6	days	g z days				
	No	Per cent	No	Per cent	No	Per cent			
Pathological changes Chronic of aubocute cholecyatitis Chronic of aubocute cholecyatitis Hindapon of gall hindder Empyema of gall hindder Empyema of gall hindder Gangecen on perforated Perforation with abscess Perforation with general peritoritis	9 3 18 4 3	7 44 10 7	0 1 4 12 6	25 5 13 35 15	2 1 7 1 6	12 6 41 6 35			
Stones present	37	90	30	94	16	04			
Type of operative procedure Cholecystectomy Cholecystectomy Cholecystectomy Cholecystectomy Cholecystectomy Cholecystectomy Choledochostomy Choledochostomy Choledochostomy Sumple drainage of an abscess	32 2 2	10 78 5 5	17 10 4	53 35 13	3 10 1	17 59 6			
Bactenology Cultures taken Stemie Exchenica coli Exchenica coli Surpicoccus viridans the Lowa pathogen Miscellaneous	32 12 13 3 3	33 41 9 9	21 12 2 3	57 20 15	15 3 7 2 1	20 47 23 7			
Mortality	3	7.3	}		2	12			
Postoperative course Smooth Notable complications		68 32		82 18		61 39			
Average hospital days Total Postoperative	27 20		25 20		32 27				

One 74 year old man was morthund on admission but was operated upon and a gangrenous gall bladder with a gener alized pentionitis was found. Cholecystostomy was carried out. Cultures grew Escherichia coli and Streptococcus vindans. His postoperature course was stormy and he died 7 days later of bronchopneumonia. Autopsy confirmed this diagnosis.

The second case was a woman & years old who had a sample acute cholecystitus complicated by common duct stones. The gall bladder was removed and the common duct was drained. She developed a flood stream infection with Streptococcus viridans and died on her thriteth post operative day. Autopsy showed a portal and mesentene thrombophlebitis, suppurative pylephlebitis, liver absesses, and a subphreme absecss.

The third case was a woman 71 years old, who had an empyema of the gall hladder for which a cholecystostomy was performed Cultures grew Escherichia coli. She died shortly after operation, presumably from shock. No autopsy was obtained

In the group in which the symptoms subsided and operation was performed in the interval, there were no deaths In the group in which the symptoms failed to subside on conservative treatment, there were 2 deaths, or a mortality of 12 per cent

One patient, woman, aged 75 years, was operated upon as an emergency of ays after admission. An acute condition of the gall hladder was found, complicated by common duet stones and evidence of an acute cholangeus. Chole cystectomy and choledochostom were performed and cul tures of the ble grew Escherichia coli. After operation she developed a pulmonary edema with cough which brought about a wound separation and evisceration. Pertonnits followed and this was the cause of her death. No auttopsy was obtained.

The other case was that of a 66 year old woman who was operated upon as an emergency after 3 days of conservative treatment. A perforated gail bladder with multiple periobidecystic abscesses was found and cholecystostomy was performed. Cultures grew Eschenchia coli and Strepto coccus viridans. She had a long and stormy course with a severe wound infection and a duodenal fistula. Eventually the evidence of a subphrenic abscess presented itself and this was offanned transpleurally in two stages. She died shortly after the second stage, presumably of a pneumonia. No autopy was obtained.

It is of interest to note that Streptococcus vandans was cultured in 3 of the 5 fatal cases. One also may observe that there is a tendency for the mortality figure to rise steadily as the pathological process increases in seventy.

A glance at Table II shows no mortahues among the cases in which the symptoms were allowed to subside and the patients were operated upon in the interval. However, in the group in which symptoms falled to subside on conservative treatment, the mortality reached its highest peak (12 per cent). Although the senes is small it would seem that this figure may be of significant.

If we analyze the mortality figures according to the type of operative procedure carried out, we find that 3 deaths followed cholecystotomy and 2 followed cholecystectomy plus choledochestom it must be remembered however that cholecystostomy was the operation of choice on the poorer rasks and on the patients presenting the most mark ed pathological changes. The presence of common duct stones necessitating the opening of the common duct naturally uncreases the mortality in these elderity patients.

There was nothing unsual in the chincal history or physical examination of the fatal cases that labeled these cases as more senous than the average and the temperature reaction and levocate count were not out of proportion. However the average age of patients in the fatal groups was 1; sears as compared with 464, years for the entire group. The average duration of symptoms before admission was 1, days or nearly twice as long as the average for the entire group. These two factors were probably unportant from the standonout of mortality.

MOREIDITA

Referring again to Table II we see that the average number of postoperative days was slightly more for the patients operated upon during an acute phase of the disease. This is explained by the fact that in these cases cholecystostomy was done more often rather than cholecystectoms The average number of postoperative days for patients receiving cholecystostomy was 26 days as compared with 17 days for those on whom a cholecystectoms was done. In other words the patient receiving a cholecystostomy must expect to remain in the hospital an average of 9 days longer than the patient who has the gall bladder removed Furthermore, we find that wound infections and stormy po-toperative courses appear more frequently in the cholecystostomy group In evaluating the morbidity we should perhaps realize again that cholecystostomy has been the procedure carried out on the more desperately ill patients, and this factor may easily account for some of the apparent differences.

LATE RESULTS OF CHOLECYSTORY

The late results of cholecystostomy vary markedly in different chaics (4, 8 o 17) Most writers report a high incidence of recurrence of symptoms, cholecystectomy eventually being necessary (6. 7. 21. 26) In this series of cases a follow-up report was obtained in 42 cases in which a choleevstostomy had been done for acute cholecysmus. the longest time interval since operation being about 7 years. Of these, in 80 per cent there was complete relief of symptoms immediately follow ing the procedure, but in only 40 per cent vas the relief permanent. The other 40 per cent had a recurrence of symptoms in from a month to a vears following operation. There were o patients, or 20 per cent, who did not get even temporary relief Seven patients or 17 per cent of the group followed came to re-operation. Two of these pa tients were re-operated upon while they were still in the hospital, cholecy stectomy being carried out. A third patient returned in a month with a bili are textula stell present and a cholecystectomy was done at that time. A fourth returned for choleexstectomy in a months. The 3 other cholecystee tomes were done I vear 2 years, and 4 vears, respectively after the first operation. It is possible that, if to years beace the group were followed again the percentage of permanent rebel from cholecystostomy would be even lower than 40 per crat (21)

The average duration of bile drainage following cholecystosium, was about 5 weeks, the extremes being 2 weeks and 3 months. This does not in clude 2 cases of apparently permanent biliaristial which have been draining bile for 1 year and 5 years, respectively. The incidence of in cisional herma in the followed cases of cholecystosium was 19 per cent. In the light of the figures given it would seem advisable to carry out cholecystection whence er at all feasible to

TREATMENT

As has been brought out, there were about an equal number of patients in this sevens who were operated upon immediately (at cases) and treated conservatively (ap cases). The senes should for this reason, be very well suited for a critical analysis of the ments of each form of treatment, should be emphasized acain that, in the strict scare of the word, very few of the patients were operated upon in the earliest stages of the disease

(Table I) Since we seldom see very early cases in this clinic, our problem has been in respect to the treatment of the patients as we see them, several days having elapsed since the onset of their symptoms. In the patients operated upon within the first 24 hours after admission, the mortality was 7 3 per cent-a figure somewhat higher than the mortality for the entire group of cases In the cases in which the symptoms were allowed to subside and the patients were operated upon during the interval there was no mortality It would appear, therefore, that if in each case the symptoms could be depended upon to subside, then the conservature form of therapy would be without question the most rudicious

However, we are faced with the fact that of the 40 patients who were treated conservatively there were 17, or 35 per cent, who failed to subside and vere by necessity subjected to operation in an acute stage of the disease. It is this group that carned the high mortality, the high morbidity, the greatest number of complications, and the

greatest number of hospital days

For this reason a careful analysis was made of this group in an effort to find some constant factor which might enable us to tell in advance in which cases it was possible the symptoms would subside on conservative management and in which they would not A glance at the clinical symptoms is at once discouraging in this respect Pain, tenderness, and rigidity are such constant findings that no belp is offered along this line Jaundice was seen more often in patients with perforation or gangrene than in any other single pathological condition It was present in approximately half the patients who were later found to have a perforation This is of very little diagnostic help, however, since it also occurs in simple acute cholecystitis, empyema, and of course in those cases in which a stone is present in the common duct. In our series it was seen eight times in empyema and nine times in simple acute cholecystitis Chills similarly occurred with all types of the disease and were not always associated with common duct pathology Chills associated with empyema occurred eight times and with simple acute cholecystitis and perforation of the gall bladder four times each By far the majority of patients in whom a palpable mass was felt proved to have either an empyema or a hydrops of the gall bladder However, a mass, or at least a questionable mass, was also felt in 7 cases with perforations and pericholecystic abscesses, and in 6 cases of simple acute cholecystitis A study of the temperature reactions produced by the various types of cholecystic disease was also marked by disappointment,

the group of cases showing the most marked pathological changes had only very slightly higher temperatures than the average of the entire series There were 21 patients having fever over 102 degrees, 8 of these had empyema, 4 had simple acute cholecystitis, 4 had perforations, 3 had gangrene, and 2 had subacute cholecystitis It soon becomes obvious that we cannot estimate the extent of the disease by the febrile reaction it produces

Finally we turn to the leucocyte count for help This laboratory test has been suggested by several authors as the most reliable indication of the seventy of the inflammatory process (27, 30) There were 33 cases in this series having leucocy te counts over 15,000 Of these, approximately 50 per cent were in patients with empyemas. The other 50 per cent were about equally divided among the other groups Although the highest counts were seen in cases of empyema there were enough low ones to bring the average of the entire empyema group down to 15,000 As a matter of fact. in 44 per cent of the empyema cases the leucocyte counts were below 15,000. The average leucocyte count of the cases in which symptoms failed to subside on conservative therapy was 15,100, the average leucocyte count of the group of fatal cases was only 16,600 Thus we are forced to admit, as so many have

helpless in predicting the extent of the pathological process until the abdomen has been opened at the time of operation In the cases in which symptoms failed to subside on conservative management, we find a high percentage of stones impacted in the cystic duct (89 per cent) and a higher percentage of perforations (35 per cent) There was also a higher percentage of positive cultures obtained in this group. The patients in this group were 4 to 5 years older than the average of the entire series, and the delay in coming to the hospital was I to 3 days more-factors which may be of some significance. However, there was nothing in the symptomatology or physical signs on admission that would lead one to suspect a more active or progressive type of infection We must, therefore, face the facts and

done in the literature, that we are often quite

certainly be indications to discontinue conserva-Indeed, it would appear that there are entirely too many factors at work in the course of acute

state once more that we cannot with any degree

of certainty tell in advance in which cases symp-

toms will subside on conservative management

and in which they will not An increase in the amount of pain, tenderness, or rigidity, a rising

temperature, or a rising leucocyte count should

tive therapy in favor of operation

cholecystic disease to afford much hope for the standardization of its treatment. Until we have learned the reason why in some cases the disease progresses and in others subsides, the best form of therapy would seem to be one of individualization For those who are experts in the surmeal treat ment of the biliary tract, the hazards of operation during the stage of acute inflammation are, of course, not so great. However, the practice of early operation in an indiscriminant fashion by the general run of surgeons would probably bring about an increase in the mortality throughout the country. In each case there is an optimum time for operation and the determination of which must be based on a study of the individual problem.

A discussion of acute cholecystic disease is not complete without due emphasis in regard to the prophylactic treatment. Practically all writers on this subject bring out the fact that a high percent age of cases give histories of gall bladder disease in the past (15) In our series of cases, gall stones were present in 02 per cent. There were 13 patients in the entire group in whom the attack bringing them to the hospital was the first manlestation of cholecystic disease. The remaining 87 per cent gave a history suggesting biliary tract disease and about balf of them had experienced definite bihary col.c

SCHOOLEY

- t. The treatment of acute cholecystic disease has produced a great deal of controversy in the literature and general agreement is still lacking There can be observed in recent publications a dehnite tendency to resort to surgery earlier in preference to the policy of conservative therapy reserving operation until the interval
- 2 Another series of surgically treated cases of acute cholecystitis is added to the literature for the statistical value which it may afford
- 3 An analysis of the senes in respect to the duration of symptoms before operation was of little value in establishing an optimum time for surgical intervention
- A The fact that, of the 90 typical cases in this series, 41 were treated by immediate surgery and 40 were treated contervatively makes the senes of special value in analyzing the relative ments of these two policies of treatment.
- Each group has been analyzed from all aspects of the disease. From the standpoint of both mortality and morbidity, the best results were obtained in cases in which symptoms were allowed to subside on conservative management and the nationts were operated upon in the interval However, of the total group treated by conservative

measures, there were 32 per cent in which symptoms failed to subside and the patients were of necessity subjected to emergency surgers in an acute phase of the disease. These patients showed an even higher mortality and a greater morbidity than the patients who were operated upon as emergencies on admission.

6 No enterion was found by which it was possible to tell in advance with any certainty in which cases symptoms would subside and in which they

would not.

7 The incidence of gangrene and perforation of the gall bladder was much higher than the teaching of the past has indicated in nearly a fourth of the cases in this series this complication is shown

8 The results of cholecystostomy are discussed, based on a follow up of 42 patients so

treated.

 The problem of acute cholecystic disease is probably too complicated to be handled by any certain's erectyped policy of treatment. It would appear that this is a disease par excellence to be treated by individualizing each case as to the optimum time for operation

Note -I am greatly indebted to the late Dr. Howard L. Bove my recent chief" and counsellor for his many helpful enucums and his mature judgment in the analysis of the data obtained in this tudy

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A SIMPLE AND EFFECTIVE METHOD FOR THE CLOSURE OF BILIARY FISTULAS

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ERSISTENT fistulous openings following dramage of the gall bladder usually discharge clear mucus, if a mucocele or hy drops of the gall bladder is present, or mucopurulent material, if due to a gall stone im pacted in the neck of the gall bladder or cystic duct, or to a carcinoma. If the mucocele is a result of stenosis of the outlet, the gall bladder should be removed or the iming mucosa completely destroyed A stone impacted in the neck of the nall bladder often may be removed without hospitalization of the patient. The fistulous tract is first enlarged by daily insertion of rubber tubes of increasing caliber, or by firm gauze packing until a channel of sufficient size is formed to the point of obstruction. The calculus may then be detected with a probe or seen through a Kelly cystoscope or a urethroscope, dislodged by scoop or forceps, and removed. At times it is necessary to incise cautiously, or partially to destroy dense scar tissue overlying the stone. The latter may be accomplished by the application of small cot ton swahs lightly moistened with a 10 per cent solution of chloride of zinc. If this powerful erosive is used, little should be applied and attempts to remove the stone delayed for 24 to 48 hours, during which time a firm dry gauze packing is left in place. To reduce the size of the exposed impacted stone, cotton swabs wet with ether may repeatedly be applied until sufficient cholesterin has been dissolved from the stone to enable its fragmentation dislodgement, and ex-With all obstruction removed the traction fistulous tract usually closes permanently within a few days. It is to be remembered that an acute or subacute purulent cholecy stitis with gall stones is not uncommon in an unsuspected cancerous gall bladder Twice after the calculi had been removed and the mucopurulent fistula closed, have we seen a cancer later develop in the abdominal scar

Persistent partial leakage of the bile after cholecystectomy or the withdrawal of a drain from the cystic ducts usually indicates some type of obstruction in the ducts. In such a case we bit a rubber tube snugly in the fistulous channel and connect it with a Wagensteen or Pratt aspirator.

Usually within 24 or 48 hours the flow of bile ceases when the tube is removed and the opening is permitted to close

Fistulas following cholen stectomy or operation upon the butary ducts from which all bile is discharged are much more troublesome and serious From the constant loss of liquid, electrol, tes and the impaired intestinal absorption, the patient tends to develop an increasing cacheria with impaired ability to withstand a serious operation. Usually the fistula has resulted from an accidental division to the common duct during a cholesy stee, only or the common duct may have been drained but a more distal obstruction to the flow of bile has not been removed. Occasionally the fistula follows a cholesy associated from an accidental follows a cholesy associated from the struction of the common duct of the struction of the sommon duct.

Irrespective of cause and at times despite the retention of average weight, the patient may be a poor subject for any prolonged intra abdominal operation. To attempt to anastomose a divided duct or to unite the proximal end of an obstructed duct with the duodenum or stomach is a hazard ous procedure. It is simpler to mobilize the abdominal fistula and to turn it into the adjacent duodenum or stomach, but the liberation of the fistulous tract is not always easy and the tract.

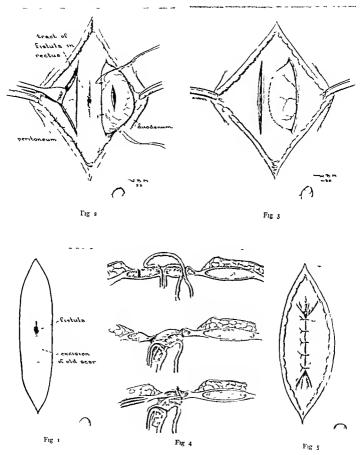
Fig. 1 Line of excision of old scar after delineating fistulous tract by the injection of ethereal solution of methylene blue

Fig. 2. The scar and subcutaneous fascas have been removed thus exposing the sheath of the mixth rectus muscle with the fivtdous opening. Parallel incisons have been mude through the muscle on either side of the fixulous tract. Through the methal inc som the doctorium has been factorially the methal incison the doctorium has been falter completion of this suture line the margins of incision in the doodenum are to be sutured about the fixtulous opening.

Fig. 3. The withdrawn duodenum is further sutured over the antenor sheath of the rectus by completing the outer row of encircling suture.

By a The top sketch illustrates the withdrawn duocleanur for storach united to the split rectors muscle ouchemate for storachly united to the split rectors muscle outhe fistufous channel. In the middle sketch the segment of rectus muscle is so rotated that the attached portion of duodeoum (or storach) has been returned to the pertonced cavity. In the bottom sketch the margins of the

anterior and posterior sheaths of the unused part of the rerus muscle have been united by suture kig 3. Closure of the anterior rectus sheath over the rotated and depressed segment of rectus



(Legends on opposite page)





Fig 1 Before and after reduction. Note that wide separation of the two bones is maintained by the fixation pins and that the free ends of these pins extend beyond the skin surface.

With the fragments held rigidly in complete endon apposition, a hole the size of the steel pin to
be used was drilled obliquely across the line of
fracture in the plane intersecting both bones.
The pin was then inserted through the drill hole
and forced across the interosseous space until it
contacted the opposite bone and had forced the
two slightly apart. The pins are of sufficient
length so as to protrude through the wound
and beyond the skin surface where they can be
grasped easily with a forceps and removed very
simply when it is no longer necessary to retain
fixation

Objectionable is the possibility that the pins may injure large ressels, the uliar, the deep branch of the radial or even the median nerve as they are forced across the interosseous space. To help prevent such an accident pins with smooth blunt ends were used in a case just recently treated.



Fig. 2 Before and after reduction was obtained and after the fivation pins had been removed. It is to be noted that preservation of a broad interosseous space has been accomplished

Figure 1 shows roentgenograms of a boy of 7 years who fell 2 feet from the top of a fence July 14, 1926, sustaining simple complete fractures of both bones of the left forearm with overriding of fragments. Three days after injury and after three unsuccessful attempts at reduction by manipulation, the patient was referred to the University Hospital where a fourth unsuccessful attempt was made

Five days later the fracture sites of the radius and ulm nere exposed through separate incisions, the fractures re duced and fixed with pins, both of which were extended across the interosseous space. Lighteen days later there was roentgenographic evidence of union, both pins were removed without anesthesia during course of a dressing

In Figure 2 are shown roentgenograms of a girl aged tayears who fell down a stariava July ro, 1926, and suffered simple fractures of both bones of the left forearm with displacement and overiding of fragments of the radius. The patient was referred to the University Hospital's days after appur. The arm had been unsuccessfully manipulated three times, twice before and once after admission. At operation, the fragments of the radius were exposed, reduced and fixed with two pins one extending across the interosseous space. Roentgenograms 18 days later demonstrated the presence of sufficient callus to permit removal of the pins.

RESECTION OF THE RIGHT HALL OF THE COLON

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11111 recent years there have been many advances in the surgical treat ment of diseases of the colon. Of the noteworthy factors which have contributed to its progress, the following may be mentioned to earlier recognition and treatment of colonic discuses made possible because of educational campagers and also because of an proved diagnostic methods (2) pre-operative measures directed to rehabilitation of the patient and to decompression and cleansing of the colon (3) introperitoneal vaccination to fortify the patient's resistance to the sprewl of infection (4) the employment of balanced anesthesia to in sure relaxation without posious effects of deep nareosis (4) improvement in operative technique and (b) the more general utilization of the prin ciple of the multiple stage eperation

In spite of these advances however there are many pressing problems till conforming the sur geon and these must be solved before surjects of the cubin can be considered on a plane equal to that of general abdominal surgers. In support of this it is necessary on the cell attention to the high mortality following surgers of the right half of the colon as reported from vertous beep talls 15 to 10 per cent (1 3 4 5). When it is reduced that among the most frequent causes of failure in colonic surgers are spread of infection (peritonius) and intestinal obstruction and since these are not always necessarily univoidable complications at is clear that there is at less a hopeful approach

The success or salue of certain surgical procedures however cannot be judged by the mortality alone. The question of what constitutes and what does not constitute an operable lesson influences the mortality. A low mortality will result when operation is performed in only highly selected cases, but certain patients will thus be denied surgical interention which if undertaken would give them a good clause for recovery and restoration of health. A balance must therefore be maintained between what can safely be done on the one hand and the desire to help the patient toward recovery on the other.

to the problem

from the Section on Survery The Mayo Class and the Day on of Survery The Mayo foundation. Real left re the meth of Trans Surveus Souety Dallas October San 16 1916 Dr Whilaker now resiles at the kepport. Ill note

The sargical problems presented by lesions of the right half of the colon differ in certain im portant respects from those of lesions in other segments of the large bowel. These differences are concerned chiefly with the character of the lesion and the type of operative procedure indicated. The tendency of lesions common to the right portion of the colon is to perforate rather than to obstruct whereas lessons in other secments of the colon tend to obstruct early in their The operative procedure suitable for lesions of the right ball of the colon is commonly limited to intropentoneal resection of this part of the colon in whole or in part together with re establishment of the continuity of the intestinal tract by means of electrologicums. I expose my obing other segments on the other hand frequently can be removed by one of several types of procedure such as by extraperatoneal resection by an extenorization operation of by segmental resection. For reasons of safets the operation of resection of lesions involving the culon other than on the right side is tishay usually carried out in multiple stages, whereas for lesions on the right sale perhaps because of the absence of obstruc tion the need for the graded procedure is not

usually recognized The employment of the two stage procedure for resection of the right hall of the colon, the applicaturn of certain underlying principles in deciding the type of anastomosis to be used and the use of the present technique, which will be described have combined to give a lower mortality and at the same time probably have increased the limits of operalishts. The basis of this study has been a series of 46 consecutive cases in which resection of the right hall of the colon was performed by one of us (Pemberton) during the past 6 years In 8 cases a single stage procedure was employed in 18 cases a two stage procedure was used employing the principles and technique to be described In addition there were 5 cases in which ileocolostomy was performed

METHOD

The type of anastomosis to be made at the time of ileocolostomy, or first stage is determined by application of the following principles. In most of the uncomplicated cases lateral ileocolos tomy is preferable because of its safety danger of interference with the blood supply to the small bowel is obvirted and a safety valve is afforded, for part of the fecal current will pass beyond the anastomosis through the normal channel An end to side ileocolostomy is preferable under certain conditions. In the presence of a fecal fistula in the region of the cecum, ascending colon, or distal portion of ileum, this procedure is necessary in order completely to divert the Subsidence of the inflammatory fecal stream reaction in the region of the fistula is thereby permitted, which will facilitate resection of the right half of the colon during the second stage of the operation If the patient is thin, an end-to-side anastomosis may also be used when the cecal growth is intussuscepted and is causing pain (a side to-side anastomosis will not relieve the pain) Likewise, in cases of inflammatory lesions of the terminal portion of the ileum, an end to side anastomosis often is preferred since it permits a greater subsidence of the inflammatory process (Figs 1, 2, 3, 4, and 5)

The patient who is to undergo resection of the right half of the colon usually enters the hospital 2 days before operation for pre operative preparation Repeated irrigations are given by rectum on the day of admittance and on the day preceding operation Likewise, a mild saline laxative is administered During the afternoon and evening before operation paregoric is administered. The howel is aspirated the morning of operation. A non-residue diet is permitted Blood transfusions are given if needed to relieve marked anemia. In addition, it is the usual custom to introduce, intraperitoneally, 48 hours before operation, r cubic centimeter of a vaccine composed of killed Bacillus coli and Streptococcus hæmolyticus in 10 cubic centimeters of physiologic saline solution

The first stage of the operation, as has been said, is ileocolostomy. A liberal incision is made through the inner third of the right rectus muscle and this extends about an equal distance above and below the umbilicus. The abdomen is explored and the lesion is examined to determine its nature, operability, and the type of ileocolostomy indicated A loop of terminal ileum is selected about 6 or 8 inches (15 to 20 centimeters) from the ileocecal valve and approximated to the transverse colon. If side to side anastomosis is indicated, the anastomosis is made over rubbercovered clamps, two rows of chromic catgut are used and the anastomosis is reinforced with adjacent omentum. The anastomosis usually is made antiperistaltic If an end to-side anas tomosis is indicated, the ileum is divided between clamps about 6 or 8 inches from the ileocecul valve. The distal end is then closed and replaced in the abdomen. The proximal end is approximated to the transverse colon, preferably by the use of a Rankin three bladed clamp, which permits of a more nearly aseptie union. Again two rows of chromic catgut are used and the line of suture is protected as before. The omentum is then care fully replaced over the small bowel in its normal position and the abdomen is closed in layers without drainage.

The patient then remains in the hospital approximately 2 weeks. The time interval between stages is determined entirely by the condition of the patient, but usually he has begun to gain weight and is stronger, and the wound is sufficiently healed so that the second stage can be performed in about 3 weeks' time

Pre operative preparation for the second stage is similar to that for the first except that intraperitonical vaccination is omitted, for it is felt that the ileocolostomy has brought about sufficient vaccination of the abdomen

The location of the mission for the second stage, or resection, is of vital importance to the success of the operation. The incision is made lateral to the scar of the incision for ileocolostomy, through the outer third of the right rectus muscle. When the abdomen is opened, the omentum will be found adherent to the anterior abdominal wall at the site of the old incision, thus walling off the small bowel from the field of operation (Fig. 2). Approach to the right half of the colon is thus made through a compartment separate from the general peritoneal cavity. A small square gauze pack is placed at the lower angle of the wound to complete isolation of the field of operation.

Resection of the involved segment of bowel starts with separation of the lateral peritoneal reflexion to the right half of the colon. The blood supply to that portion of the terminal ileum and right colon to be resected is then clamped, divided, and ligated After the cecum, ascending colon, and terminal 2 to 3 inches (5 to 7 centimeters) of the ileum have been freed from all mesenteric attachments, a decision must then be reached regarding disposal of that portion of the ileum distal to the previously made side to-side ileo colonic anastomosis which is to be preserved Unless some contra-indication exists, the terminal portion of ileum and proximal portion of transverse colon are approximated by means of a three-bladed clamp, the intervening segment of bowel involved by the lesion being removed by dividing the ileum and colon flush with the clamp, and then by means of an inverting stitch

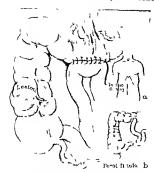


Fig. r I irst stage in re-ection of right half of colon showing the usual side to side ileocolostomy—a incision b end to side ileocolostomy (preferable in certain cases)

anastomosing the end of the sleum to the end of the colon Thus a second sleocolonic anastomosis is made which affords an escape of that portion of the fecal current which passes beyond the

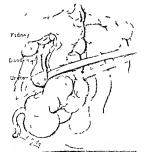


Fig. 3 Second stage in resection of right half of colon separation of lateral peritoneal reflexion to the right half of colon showing retropentioneal structures to be avoided

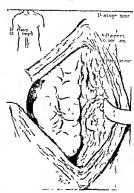


fig 2 Second stage in resection of right half of colon showing omentum adherent to scar of first stage incision

lateral anastomosis In most instances this is the easiest and simplest method of disposing of the stumps of the ileum and colon (Fig 4)

Conditions may exist however, which make it unsafe to attempt this end to-end union. For example, if the colon is greatly dilated at the site of the proposed end to end anastomosis, there will be a great disproportion in the size of the colon and ileum Likewise, when the patient is obese and the mesentery is laden with fat, the added technical difficulties may be too great to establish an accurate and safe union. In the event that it seems unwise to make this union, the end of the colon and the end of the ileum are each inverted separately. In such a disposal of the end of the ilcum it is important that the ilcum be cut across close to the site of the anastomosis (3/4 inch) If a longer sepment of ileum is preserved distal to the side to side anastomosis, part of the fecal current will pass beyond the anastomosis into this segment, and then, because of peristalsis in this segment, there is danger that the end of the bowel will be blown out, or, if it holds, the peristaltic movements of the bowel will produce nams like those produced by any intestinal obstruc tion (Fig 5) If the first stage procedure consisted of end to-side ileocolostomy the distal loop

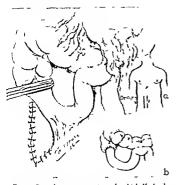


Fig 4 Second stage in resection of right half of colon, showing completion of resection and beginning of end to end anastomosis of ileum to colon a, positions of incisions and stab drain, b, completion of end to end anastomosis

of ileum is removed with the cecum and ascending colon, and the provimal end of the colon is inverted. The amount of colon left provimal to the ileocolonic anastomosis is not of so much importance, for penistalisis runs away from and not to the remaining segment, as in the segment of distal leum. The defect in the posterior peritoneum is closed, and the mesenter, of the small and large bowel is approvimated, if necessary. Through a stab wound in the right loin two Pen rose drains are inserted, which insure dependent drainage.

It is customary to complete the second stage of the operation without seeing any loops of small bowel except that part to be resected, since, as has been indicated, resection is done in a separate compartment of the abdomen which can be said to be almost extraperitoneal in relation to the general abdominal cavity. Any drainage that may occur comes from the stab wound in the loin, the incision heals primarily in almost every case. Again, the stay in the hospital is about z weeks.

RESULTS

There were 2 deaths in the group of 38 cases in which the two stage procedure was employed, grung a mortality of 52 per cent (Table I) These 2 patients who died had extensive perforating cancers of the right half of the colon, the moperability of which was determined only after an attempt had been made to remove them. An



I ig 5 Second stage in resection of right half of colon, showing marked disproportion between end of iteum and end of colon, preventing accurate end to end ansatomosis a incorrect closure of iteum, giving rise to distended loop with possible perforation, b, correct closure of distal iteum close to site of iteocolostoms.

abstract of these 2 cases is appended. Ileocolostomy, as a first stage procedure, was performed in 5 additional cases in which resection did not follow There were 2 cases of borderline operability in which resection was impossible, in I case the wound was closed on exploration at the second stage because of the extent and fixation of the malignant growth, the other patient was not subjected to the second stage of the operation because of persistent marked debility third case, that of an inflammatory lesion of the cecum, the patient showed improvement following ileocolostomy sufficient to warrant delay in further surgery There were 2 deaths, one the result of pneumonia and the other of the unusual complication of thrombosis of the lower vena cava with clear ascites and right hydrothorax These 4 deaths in the series of 43 cases in which two stage resection was performed or contemplated give a total mortality for both stages of 93 per

The 2 deaths in the series of 43 cases in which eleocolostomy was performed and the 2 deaths in 38 of these cases in which second stage resection was carried out give comparable mortalities and fluistrate the fact that the risk of resection of the

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						Ones	ation		Operative fin lings							Course following			e .	
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Carcinoma of bepatic flexure with duodenocolic fistula	,	,	_	12			-				,				_	1			16	_
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Resection of portion of wall of bladder 1Metasta, is to liver—put ent requested palliative operation Plantial disodenectomy with disodenopla by

96

Fratal massive collapse and preumonia

#[Buodenal fi.fula—fatal poeumonia

*Resection of portion of greater curvature of stomach

right half of the colon is no greater than that of the preliminary ileocolostomy. The clinical course following resection is distinctly quieter than that

following ileocolostomy In this same period primary one stage resection of the right half of the colon was performed in 8 cases (Table II) In cases with distant metas tasis in which the procedure was for palliation, in cases with marked bleeding from the malignant lesion, and in cases of a few thin patients with freely movable growths it seemed advisable not to subject the patients to a second operation and one stage resection accordingly was performed Obviously, then, this group is not com parable to that in which two stage resection was carried out There was I death, or a mortality of 125 per cent The small number of cases, of course, gives little significance to the figure for mortality The death in this group was second ary to peritoritis, no death in the group of cases in which two stage resection was performed resulted from peritonitis. In addition, the post operative course in the one group was not com narable to that in the other The postoperative course following one stage resection was distinctly

more storms, more critical and more prolonged than that following either the first or second stage of the two stage procedure (Figs 6 and 2)

ADIANTAGES

The operation as carned out in two stages has certain advantages. The development of the senarate compartment by adherence of omentum to the scar of the first incision and the subsequent placing of the second incision to enter into this compartment offer certain safeguards not avail able otherwise. In the first place, the handling of the small bowel, with the resultant trauma and possible spread of infection is practically obvi ated, as the small bowel does not enter into the field of operation If the end to-end anastomosis or the blind, closed ends of ileum or colon should leal from any cause or if there should be gross soiling during mobilization and resection of the involved bowel, the resultant infection will be confined to the compartment and can be con trolled readily by the dependent drainage through the loin

The chrucal course following resection which is the more extensive operation, usually is attended

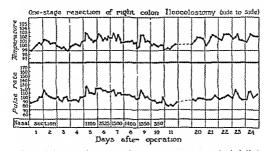


Fig 6 Pulse rate and temperature following one stage resection of right half of colon lleocolostomy (side to side)

with less reaction than that following ileocolotomy. Figure 8 is a chart of the 38 cases in which patients were subjected to two stage resection and shows a composite of the daily mean tem perature curves following each stage of the operation. The smoother clinical course that follows the second stage is best explained by the fact that manipulative trauma to the small bowel is avoided and any contamination associated with resection is localized in the separate compartment outside of the general peritoneal cavity, and perhaps also by the immunity acquired by vaccination of the peritoneum induced by the previous operation.

In cases of fecal fistula the advantages of the two stage operation are obvious. An end-to-side anastomosis diverts the fecal current from the fistula, permits marked subsidence of the associated inflammatory reaction about that portion of the bowel to be resected, and reduces to a minimum the discharge from the fistula Furthermore, if resection of the bowel is necessary later, it is done in the aforementioned compartment separate from the general peritoneal cavity. thereby limiting to this compartment any spread of infection. The same is in general true in cases of an inflammators lesson of the terminal portion of ileum and cecum, for example regional ileitis, typhlitis, and inflammatory granuloma of the cecum A preliminary end to-side anastomosis permits subsidence of the inflammation to a varying degree by diversion of the fecal current

TABLE II-RESECTION OF RIGHT HALF OF COLON (ONE STAGE OPERATION)

			ľ		•	peratio	Operative findings								Fostoperative course			
Diagnosis	Total patients	Males	Females	Age range years	Hencolostamy (end to side)	Rescalortamy (side to-tide)	Fatecattamy	Fused	Kotable	Perforated	Obstructing	Intussuscepted	Marked inflam matory reaction	Lymph nodes myolyed	Uner eatful	Beus	emporary ob struction	Fecal dramage
Carcinoma of cecum	3	3		29-64	2		3	-	3	-		1	-	10	-			
Carrinoma of ascending colon	2	2		54~49	1	2	,		,		_	-	_	zź		rš		-
Tuberculosis of cecum	1	z	-	33	-	1	1	-	-	Ţ	-	1	-	-			<u> </u> -	<u> </u>
Tuberculosis of cecum with cecal fistula	1		1	10	1			1	 	<u> </u>		-	-		<u> </u>		-	-
Tuberculous ileit,s	1	-	1	20		1	2.0	-		 - -	-		<u> </u>					
Total	8	6	1			-		<u></u>	-	 - -	<u></u>	-					1	

*Peniopeal unplants palliative operation iDistended passed no gas died IMetastasis to liver palliative operation

Required massl suction for 7 days passed some gas recovered symptoms of obstruction emergency enterestomy recovered

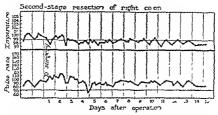


Fig. 7. Pulse rate and temperature following second: tage re-ection of right half of colon

The general condition of the patient improves following diversion of the fecal current, and thus if further operation is necessary the risk is reduced.

The value of this two stage procedure in which the second stage or resection of the colon is per formed in a compartment separate from the gen eral peritoneal cavity is further exemplified by those cases in which gross contamination oc curred Pecal drainage from the stab wound developed in a cases in this series following resec tion Drainage was tolerated nicely however, and in no case did ileus develop from infection secondary to leakage from the anastomosis The clinical course was quiet. In a cases the fistula bealed spontaneously within 2 or 3 weeks, respectively. In one fatal case there was drainage of bile duodenal content and seropurulent mat ter from the stab drain, yet penstaltic activity was not embarrassed. The bile and purulent

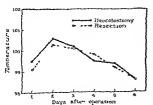


Fig 3 Composite of daily mean temperature curve in 38 cases following each stage of the operation.

dramage subsided and at necropsy no evidence of generalized abdominal infection was found baseduated partial gastine resection was carried out in r case, and partial duodencetoms in a cases, convalencence was unevential except in the fatal case, which will be described later

The value of end to side ileocolostoms with complete diversion of the feest stream, which per mits subsidence of the inflammator, reaction in the region of feest fistula and thus facilitates the subsequent resection is demonstrated by the following representative case.

A case agred 20 years had an ordannastery lesson of the cocum and terminal portion of them complicated by a feed fittable. A subsequently elected fittable a subsequently representation of the subsequently for the control of the subsequently for the mouths better exection reals advanced but at operation. The mouths better exection reals advanced but at operation of the mouths better exection reals advanced but at operation of the desired portion of the desired fitted that the subsequently real to the feed where There was masked subsequently for the feed with the feed where There was masked subsequently for the feed with the feed of the feed with mouth at the Occasionally in cases of an inflammatory let on of the theocort region in which the pathologonal process is not one far at vanced end to subsequently feed with the feed with the feed with the feed of the feed with the

ARSTRACT OF TWO CASES IN WESCH PATIENTS DIED

The two cases in which the patients died following the second stage of the two stage operation are presented in some detail. As stated before it becomes difficult at times to maintain a balance between the desire to give each patient his chance of cure and what must be considered an imper able condition. In both these cases, the operability must be considered and indicated by the considered and indicate the considered as moper able condition.

Case : A man aged 6 years in poor health was subjected to ide to-side ileocolostomy for carcinoma of the

hepatic flexure of the colon on October 3, 1935 The growth was the size of a double fist (about to centimeters in diameter) and was fixed. Convalescence was slow and the patient was permitted to return home in the hope that he might gain more strength. After 2 months he re tumed very little improved and neakened by diarrhea The risk of operation was graded 3 on a basis of 4 The abdomen was explored and the right half of the colon re sected on December 2, 1935. The growth had perforated necessitating its separation from the liver, posterior abdominal wall, and retroperitoneal portion of the duo The patient's immediate postoperative course was satisfactory until the third day, when definite collapse of the right lower lung developed. He passed some gas, but the abdomen was slightly distended Death came on the sixth postoperative day and was thought to be due to pulmonary complications

Case 2 This second case was very interesting and again

demonstrated to us the value of the two stage procedure The patient a man, aged 52 years, entered the clinic com plaining of loss of weight, anemia, and diarrhea. He was found to have carcinoma of the hepatic flexure, this had perforated and a fistula with the second portion of the duo denum had resulted Heocolostomy, side to vide, vas performed on June 11, 1036 The fistula was noted, and a fixed mass, the size of a fist, was found in the colon The lesion was thought probably to be inoperable. The patient, however, made a splendid recovery from the ileocolostomy and gained neight, and it was thought best to attempt resection, which was carried out July 9 1936 Exposure of the mass revealed its extensiveness and fixity, and once it was exposed it was necessary to continue with the resection The growth was separated from the liver, leaving much ra s surface The fistule was excised, and an opening 6 by 4 by 3 centimeters in the duodenum (which was left) was closed The growth was perforated during resection and some gross soiling took place. The immediate post operative course was quite gratifying. The patient passed gas and liquid stools on the third day and continued to do so Bile and seropurulent dramage from the stab dram in the loin persisted for a few days. A duodenal instula developed on the sixth postoperative day, but this was controlled with suction Bronchopneumonia graded 3+, developed, and death occurred on the twenty second postoperative day Necropsy revealed the presence of the fistula, but the abdominal cavity was free of infection No caremoma was found

Here, then, are 2 cases in which there were extensive growths and in which the patient was subjected to extensive surgery with obvious

soiling, grossly in I case, yet death was due to pulmonary complications Had it been necessary to handle the small bowel, with exposure of the general peritoneal cavity, death no doubt would have ensued promptly from peritonitis

SUMMARY AND CONCLUSIONS

The employment of the two stage operation for resection of the right half of the colon and the application of the principles and technique described have combined to give a lower mortality in surgery of the right half of the colon and at the same time have undoubtedly increased the limits of operability

In a consecutive series of 38 cases second stage resections of the right half of the colon were performed, with 2 deaths, or a mortality of 5 2 per cent Heocolostomy, as a first stage procedure. was performed in 43 cases, with 2 deaths. These 4 deaths in the series of 43 cases studied give a total mortality for both stages of q 3 per cent There were no deaths secondary to peritonitis

Resection of the right half of the colon as the second stage is the more formidable procedure, but it has been performed at no greater risk and with less reaction than the preliminary stage of ileocolostomy

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THE TREATMENT OF THROMBOPHLEBITIS

With Acetyl-Beta-Methyl Choline Chloride Iontophoresis

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HROMBOPHLEBITIS constitutes one of the most stubborn and disabling con ditions affecting the lower extremities Despite the many forms of treatment, including long periods of rest in bed with elevation of the legs and the use of supportrue bandages which have been recommended during the past 50 years, in a large percentage of these cases beal ing fails to occur In many instances there con tinues a low grade, smoldering condition which is easily activated by traumatism or by prolonged standing. In others the condition becomes chronic with a superimposed lymphedema of the entire extremity. In this report a new method of treat ment of thrombophiebitis which appears to be more satisfactory than any bitherto suggested is described

ETIOLOGY

Thrombophlebitis is an inflammation of the vein wall with a secondary thrombosis due to changes in the endothelium According to harsner the vein may be involved in the inflam mators process either directly or through the medium of lymphaucs, i.e. there may be a lym phangitis involving the veins. There are the suppurative and non suppurative types of throm bophlebiti Slowing of the blood flow is a predisposing factor in the causation of this condition Thrombophlebitis is quite common following a prolonged stay in bed from any cause. It is also frequently found after operation, and especially after pelvic operations Febrile diseases, such as pneumonia, typhoid fever, and especially in fluenza are frequently complicated by thrombophiebitis Anemia and increased coagulability of the blood predispose to the development of this entity Trauma in the presence of a quiescent phlebitis is very often the exciting cause of a recurrence of the acute stage Syphilis, gout, and tuberculosis have been found to be associated frequently PATHOLOGY

Because of the anatomical relationship of the veins of the left lower extremity, this member when the condition is unlateral has been most frequently involved. In the majority of cases however, both legs are involved The involvement

From the La cular Clinic of St Mary a Hospital.

may vary in degree from the presence of a small nodular thrombus to that of the most severe type of thrombophlebitis, e.g. phlegmasia alba dolens, in which the iliac or femoral vein is blocked Also, in some cases the onset may be sudden. acute, with the typical fever, chills, and excruciating localized pain while in others the symptoms are mild, but there are noted the persistent tired ness soreness, and occasional ankle edema after prolonged standing

According to Lenche pain, edema and functional impotency in phlebitis come from a disturbance of the innervation of the vascular wall. an excitation of a sensible nerve, which plays a more important part than the mechanical obstruction of the blood stream" Thus the spastic element of phiebitis plays an important rôle in the nathogenesis of the attending functional trouble

Aside from the pain associated with thrombophlebitis there are other changes which are dependent on venous and lymphatic obstruction, i e edema of the subcutaneous tissues of varying degrees from a transient ankle edema to a per sistent brawny edema of the pseudo-elephantiasis type, from the ankle to the groin In the chronic form this edema has been found to persist over a period of 20 years in some cases

TREATMENT

Logically the clearing up of a thrombophlebius with renous and lymphatic obstruction should be dependent on an increase in the local circulation, the elimination of the local edema and the relief of pain, without increasing the danger of the formation of embolt. In the acute stages of thrombophlebitis the practice of anything but the most conservative and classical methods would be contrary to all known principles. The patient should be given absolute rest and the himb elevated to avoid the danger of pieces of soft thrombus being dislodged and thrown into the general circulation When the thrombus is firm however as we find in the long standing or afebrile cases, treatment may be instituted toward the relief of pain due to venospaem and toward the improvement of cir culators imbalance by aiding the local circulation in the elimination of the local edema. Many of the previous forms of treatment, such as rest

and elevation of limb, the use of elastic handages, rubber stockings, or "Unna's boot," ligition of veins, have been used as controls in this series in an attempt to promote this physiological state

but without satisfactory results

A group of workers (1) at the Post Graduate Hospital has recently reported successful results in the use of acetyl beta methyl chohne chloride! by the method of iontophoresis in the treatment of chronic varicose ulcers (4), by which the local circulation was stimulated very effectively Thrombophlebitis is a closely associated condition and is very often found to precede the forma tion of chronic varicose ulcers. In the vascular clinic of St. Mary's Hospital we have collected a series of 33 cases followed over a period of 1 year in which this method of treatment alone was These patients had had the thrombo phlebitis for from 1 week to 20 years without relief from any previously used treatment. The average age of the patients in the series was 52 6 years The average number of treatments given was 15, with a minimum of 4 in Case 6, and a maximum of 63 in Case 13 This latter patient had a severe, long standing chronic phichitis with marked lymphedema and also a large varicose ulcer of the leg (10 by 8 centimeters) The average period of treatment was 6.7 weeks with treatments given two to three times per week

In this report we present the results of the treatment of the first 33 consecutive cases of thrombophlebits that have come under our care since we began this form of treatment. No selection of cases was undertaken. We would stress the following conditions of our experiments.

1 Our patients had been through a period of control ranging from 1 week to 20 years during which time all recognized forms of treatment for this condition had been tried on one or more of them without success

2 During our period of treatment only 4 pritients were hospitalized or put to bed. These came to us with such severe pain due to the thrombophilebitis that they were unable to work, but not one of these was required to stay more than I week in the hospital. They were all urged to go about their usual work.

3 No other form of treatment was used with the possible exception of the comforting support of an ace elastic bandage for the first week or

two, after which it was discarded

4 No patients with acute thrombophlebitis with fever, chill, etc., is included in the series as we believe it would not be use in these to attempt any treatment other than rest and elevation

However, after the febrile stage had subsided we instituted this form of treatment with no untowird results and a shortening of the period of disability

5 In the evaluation of the degree of disability caused by the thrombophlebits in each case, a relative scale of from one plus (1+) to four plus (4+) was used, one plus indicating but slight subjective discomfort in getting about at their usual daily routine, and four plus indicating a complete distability. Some of these latter pritents had to be hospitrilized, the others were able to come to the clinic on crutches or vir wheel chair from their auto to the treatment room, especially during the early course of the treatment. The other degrees are estimated proportionately

6 The results obtained are classed as improved or not improved depending upon, (1) the objective signs such as disappearance of tenderness along the myolved vens, loss of edems, and healing of ulcers, and (2) subjective symptoms of loss of pain, of tiredness, and of herviness of the legs after their usual hours of routine work. The relative grade of improvement is scaled proportion.

ately in the results obtained

MECHANISM OF HEALING, PRECAUTIONS

The mechanism by which this healing is accomplished is not clear. Three explanations may be advanced The results may be due to any one or a combination of the three Tirst, the production of an increased local circulation may promote a more rapid removal of the waste products and increase in local nutrition thus producing regen eration of the tissues, second, the marked local diaphoresis, which may continue for from 4 to 8 hours after the treatment, may reduce the edema resulting from the hydrostatic pressure and, by reheving the tissues of this overload of fluid, may permit healing, or, third, the relief of the spastic element of the phlebitis may lessen the disturbance of the innervation of the vascular wall which plays a part in the mechanical obstruction of the blood stream. In these eases, injection of veins is a definite contra-indication until long after the active phase is passed, and, even then, there is danger of recurrence and embolism. No active form of treatment such as massage, heat or diathermy, may safely be given to favor healing It is therefore of benefit that some safe method of therapy may be used not only for the relief of pain, but also for the re establishment of

a balanced circulation in these affected limbs
When one considers the lick of success that
has accompanied the treatment of chronic thrombophlebits heretofore and the encouraging results

Drug supplied through kindness of Merck & Co

TABLE I -- THE TREATMENT OF PHLEBITIS WITH ACETYL-BETA-METHYL CHOLINE CHLORIDE IO TOPHORESIS

Patient	A e Sex	Type phietitis	Duration	Dis- ability	Etrology	Duration of treat ment	No treat ments	Result	
1 // B	69 18	Chronic bilateral and lymphederas	20 yzs	++	Appendectomy	7 ands	16	Improvement	++
A A K	18 F	Acute bilateral deep femoral	3 373	++++	Thyrout ctomy	z wks	0	Lattle improvement	
3 C T	53 F	Subacute bilateral	20 3003.	+++	Cholecystectomy	В вось	23	Improvement	+++
4 G H	04 12	Chronic left leg and lymphedema	16 373	++	Influenza	1 1905	16	No edems	++
SMT	5.9 F	Subacute hilatera!	2 375	++++	Gnppe	6 wks	8	Improvement	++++
6 A C	95 F	Subacute bilateral	3 1805	+++	Colitis aurscular Ebrikation	1 mg	•	Improvement	++
TAM	£4.	Subacute bilateral	z me	+++	Chronic sinustria	9 days	5	Improvement	+++
TLS	10	Chronic b is eral lymphedema and	a yrs	+++	Pleurisy	3 mos	źσ	No edema	+++
9 M G	63	Subacute bilateral	3 ti/00	+++	Cholecystitus	6 wks	17	Improvement	+++
TO E H	¥	Subac a bilateral	et mos	++	Colitus	\$ troos	12	Laprovement	++
HAD	10	Subacute bilateral	15 y	+++	Influ nza	\$ 20.05	12	Laprovement	+++
11 P B	39	Chronic bulateral and multiple	22 yrs	++++	Pulmonary tuber	ay days	27	Ulcers heal	++++
II W T	ti.	Chronic left le lympheders and	3 yrs	++++		5 Anos	63	No edema	+++
14 A.P	13	Chronic bulateral and lymphedema	1 yr	++	Smusitis	1 2013	26	No edema	++
15 3/ }	14	Acute bilatetal	7 315	++++	Czauma.	£ 220	30	Laprovement	7777
16 J.L	5,5	Subscrite bileteral	3 37	++	Cholecystique	a mos	10	Improvement	++
17 A B	63	Subscute in le 1 leg	3 mos	+++	Influenza	1 772	3	to amprovement	
18 D 5	19	Subacute in leit leg	\$ 20'0	++	Frauma	1 77 2	6	Improvement	++
19 C b	18	Chronic lets leg lymphedsons and ulcer	20 YIS.	++++	Type oud fever	3 mos	50	No edema	+++
29 G D	10	Subscute in left ieg	1 ED0	++	Straut	1 200	17	Improvement	++
21 10 C	6,5	Acute in right leg	1 1 1 1 3	4++	Overesettion	1 mo	11	Improvement	+++
2152	20	Chronic left leg varicose ulce-s	swk	++	Standing	£ EDG	19	Ulcer healing	++
23 A 5	4	Subacute bilateral	2352	++	Standing	22 days	8	Improvement	++
14 B A	7,1	Subscute busteral	8 yrs	++	Colstrs	S WIZ	6	Improvement	++
1, E G	4"	Subacute by ateral	150	+++	Hysterectomy	0 wks	12	Improvement	+++
26 £ F		Acute b ateral	5 247	++++	Hypertrophic arthritis	z wks	9	Laprovement	+++
2 TB	35	Subacute busteral	2 1008	++	In set on	a wks	16	lasprovement	++
23 LL	68	Chronic bilateral	9 mos	++	Hypertrophs.	5 WES	16	Improvement	++
20 k G	15	Subacute in le't leg	6 mu	++	Arterial occlus on	I mo	15	Improvement	++
30 E 5	45	Acute right les Variouse ulcerà	4 1005.	++++	Trauma	eo days	5	Improvement	777
31 M L	40	Subarute b lateral	2 yts	++	Influenza	* m	0	Improveme_t	++
32 11 31	5=	Subscute b lateral	3 512	+++	Choletystitis	2 Wk.	6	Improvement	+++
II CH	48	Subacute bilateral	I mho	++	Hysterectoury	s wk	0	Improvement	++
****	L	L							

shown in practically all of the cases herein reported, this method warrants further study and clinical use

TECHNIQUE (4)

A standard o 5 per cent solution of acetyl betamethyl choline chloride is used Reinforced ashestos paper saturated with the o 5 per cent solution of the drug is wrapped around the foot and leg as high as the thigh A malleable metal plate is placed over the wet ashestos paper and is connected to the positive pole of a galvanic machine A large, regular, moist electrode is used as a dispersive electrode This is placed under the back and is connected with the negative pole. The current is turned on slowly and increased to 20 or 30 miliamperes At the end of the treatment, the current is slowly reduced and turned off Treatment is given in some cases dady, but generally, for from 20 to 30 minutes, two to three times weeLly

General reactions A moderately severe reaction resulting from this iontophoresis treatment might be characterized by (1) a marked flush extending over the face, chest, and upper part of the abdomen, (2) increase in the pulse rate, (3) a deeper, slower respiratory cycle, (4) a marked drop in the blood pressure (which has been so profound on several occasions that it was necessary to terminate the experiment with atropine), (5) marked salivation (in one instance as much as 140 cubic centimeters of saliva was collected in 20 minutes), (6) marked lacrimation, (7) profuse diaphoresis, (8) increased intestinal peristals with abdominal griping and occasional immediate defecation, (o) occasional substernal pressure (10) diuresis, in certain individuals, to a varying degree, (11) slight cyanosis of the tips of the extremities, with a drop in the surface temperature, which usually rises above the original level in from 1 to 6 hours If desired, immediate cessation of effects may be produced by the injection of atropine, one one hundredth grain (0 00065 gram) subcutaneously

These systemic reactions constitute an exact duplicate of the reactions following the subcutaneous or intravenous administration of the same drug but are more certain, more prolonged, and more easily controlled. They are rarely noted with iontophoresis except in the mild form.

Local reactions In addition, there is a characteristic local reaction, directly under the site of the application of the drug This consists of (1) a feeling of prickling followed by warmth during the treatment (2) the appearance of goose fiesh immediately after the removal of the isbestos

paper, (3) a local blush of the skin, (4) sweating of the skin, which may continue from 6 to 8 hours, (5) an elevation in surface temperature, during treatment, followed by a drop during profuse sweating (with accompanying exporation) and a use above the former level in from ½ to 5

Neither the general nor local effects noted can be produced with the use of salme iontophoresis or by the galvanic current alone. Likewise they cannot be produced by merely soaking the area in a solution or by using an ontiment containing up to 25 per cent of the drug. Acetyl bett-methyl choline chloride solution plus the use of the galvanic current must therefore, be responsible for the effects.

Individuals vary in reactions, as in the use of most drugs. Some individuals who scarcely react to the first treatment show an increasing reaction to subsequent treatments.

RESULTS

Acetyl beta methyl choline chloride iontophoresis has been used in the treatment of 33
cases of thrombophilebitis. The age, type, duration, and degree of disability, duration and number of treatments, and the results are given in
Table I Thirty-one patients were definitely
improved and were able to get about with ease
and without the aid of any supporting bandages
whatever Of 488 treatments given, not one untoward reaction was noticed. Cases with lymphdema cleared up remarkably in a comparatively
sbort time after years of progressive discomfort
Associated variouse ulcurs healed readily. This
confirmed the reports from the vascular clinic of
the New York. Post Graduate Hospital (4)

The 2 cases in this series with unsatisfactory results bad received too few treatments to give the method a fair trial. Their case histories follow

CASE 2 A K, a young woman of 28 years, had a severe acute blateral thrombophlebits of 3 years' duration, involving the deep femoral and iliac veins. This condition followed a thyroidectomy and resulted in complete distability due to pain. She also had a severe secondary anemia with a hemoglobin of 50 per cent and a hypothyroidism with a basil metabolic rate of -20. She came to the clinic for four treatments over a period of 2 weeks and then stopped hecause of the great effort necessary for her to attend. She was advised to enter the hospital but did not follow this advised.

Case 17 A B, a woman of 63, had a subacute thrombophelbits in solving her left leg of 3 months' duration and with a disability graded as 3+ An attack of influence creded the onset of her disability. She was given 5 treat ments in 1 week with little or no improvement. She left this vicinity due to some family situation, with her treatments incomplete. She expects to return at a later date for further treatments

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A MODIFIED SIEVE GRAFT

A Full Thickness Skin Graft for Covering Large Defects

LESTER R DRAGSTEDT, M D Ph D, and HARWELL WILSON, M D, Chicago, Illinois

N 1930, Beverly Douglas described in this Journal a method for transplanting rela tively large full thickness skin grafts which he first devised and used in 1928 He called it a 'sieve graft method because the graft is uni formly perforated with small round openings' The advantage of the method to which he drew attention was that it provided for adequate drain age, prevented the accumulation of serum or exudate hetween the graft and underlying bed and so afforded a better opportunity of overcom ing yound infection. The method of preparing the graft vas so devised as to leave behind au merous small islands of skin from which regenera tion could occur making it unnecessary to treat further the donor site We used the method of Douglas a number of times and became impressed with its practical value. It retained the advantages of the Wolfe Krause full thickness graft m preventing contracture and providing a new skin surface resistant to minor injuries while also affording a higher incidence of takes especially in the presence of a moderate infection

The method vinch we aish to describe in this report retains the advantages of the perforated full thickness graft of Douglas while it greatly facultates healing of the donor site. In addition the graft is easier to prepare, requires no special instruments, and the operation is much less time consuming. The wound to be grafted as prepared in the usual manner. An oval shaped transplant as illustrated in Figure 1, a, is then prepared, eare being used to secure the full thickness of skin with nore of the subcutaneous fat. The long

From the Department of Surgery of the Unagerity of Chicago
Douglas Beverly Surg Gynec & Obst., 19 a, 30 1018

axis of the graft should be about one third longer than the long axis of the wound to be covered The lax skin of the abdominal wall furnishes an excellent donor site, and since the wound is elliptical it can be readily closed, usually without undercutting As soon as secured the graft is placed, dermal side down, on a smooth towel moistened with physiological salt solution, and then with a small sharp sculpel numerous short incisions are made as illustrated in Figure 1. b These incisions should be overlapping and when completed permit the graft to be stretched into any desired shape. In practice we have found that the original graft need not be more than one third to one half the width of the defect to he covered. The transplant is sutured into place and pressed into firm contact with the underlying bed Vaseline gauze is then placed over the graft and covered with flat gauze and sea sponges in the manner advocated by Blair The sponges are removed in 7 days and the graft is inspected Statches are removed and the compression dress-





Fig x a, Oval shaped transplant b numerous overlapping incisions c graft stretched to shape of area to be covered



Fig 2 Appearance of wounds in Case 1 in 7 days and in 25 days after operation

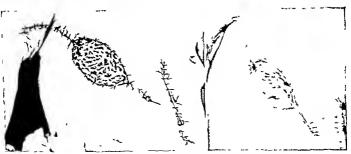


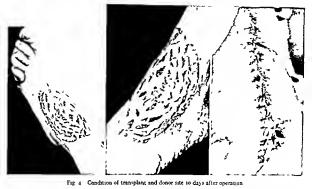
Fig 3 Condition of wound in Case 2 in 9 days and in 30 days after operation

ing is reapplied for another week, when ordinary dressings are used. The donor site has invariably healed within a week or 10 days and this fact constitutes one of the chief advantages of the method.

The following abstracts of case histories illustrate our experience to date

CASE I Unit No 92936 S M, male, aged 27 months Eighteen hours before admission the right arm was caught in a clothes wringer. On examination a hemationa was found on the volar aspect of the arm extending from the availa to just below the elbow and the entire extremity was markedly swollen. The skin was cleansed with water and alcohol and sternel dressings were applied. Twenty four

hours later an area of necrous 5 centimeters in diameter appeared in the cubital fossa. This area extended gradually to the artilla. Operation was done 9 days after the injury. The necrotic tissue skin and subcutaneous tissue was existed leaving a large wound on the volar aspect of the arm extending from the cubital fossa to the artilla. A full thackness graft, elliptical in shape, was taken from the anterior abdominal surface, treated as described, and sutured into the defect. The abdominal wound was closed and healed in 8 days. All of the triansplant took except for a small area of separation at the upper angle. This was resutured and the wound was entirely healed in 18 days. The photographs which are shown in Figure 2 give the appearance of the wounds in 7 days and in 25 days after operation.



CASE 2 Unit No 14183, C N female aged 53 years. Following a radical mastectomy for carcinoma of the breast a defect (11 by 5 centimeters) remained in the in cision which could not be closed. A full thickness transplant was taken from the neighboring lax skin of the ab-domen and was sutured into the wound Figure 3 left shows the condition of the wounds at the end of o days,

and right at the end of 30 days

CASE 3 Unit \0 120649 L L female aged \$3) cars
A melanoma was excised from the dorsum of the left foot leaving a defect extending from just above the ankle to the mid portion of the foot and mea uring 12 by 7 centimeters.

A full thickness graft from the abdominal wall was sutured. into place and although the wound became infected the entire transplant survived. The photographs in Figure 4 show the condition of the tran plant and the donor site 10 days after operation healed in 30 days The tran plant was completely

SUMMARY

The description of a simple, practical method for using full thickness skin grafts to cover rela tively large defects is given. The method described utilizes the sieve graft principle of Beverly Douglas

MUSCLE-SPLITTING EXTRAPERITONEAL LUMBAR GANGLIONECTOMY

FELLY L PEARL, M D, San Francisco, California

INCE the pioneer work of Royle in 1924, the extraperitoneal approach to the lumber sympathetic ganglia has gradually gained favor over the transabdominal route. It has the advantages of lower mortality and smoother postoperative course which outweigh the disadvantage that only one side can be done at a time. In the transabdominal approach it is sometimes very difficult to remove the second right lumbar ganglion. All the serious complications which are apt to follow intra-abdominal surgery may follow the transabdominal route.

In the Royle approach (Tig. 1) the external oblique and internal oblique muscles are separated from their attachments to the iliac crest by cutting directly across their fibers close to their insertions. This tends to increase itssue reaction and to favor the accumulation of serum. Attempts to approximate the retracted ends cause strangulation and additional trauma to the divided muscles. These factors predispose to delayed healing, infection, and the possibility of incisional herma

Since 1934 the author has been concerned with improving extraperitoneal lumbar ganglionectomy by the development of a completely muscle-splitting approach. In all, three incisions have been developed on fresh cadavers and subjected to clinical trial. Two early methods, to be mentioned later, have been discarded in favor of the following operation.

Anesthesia Subarachnoid block is preferable because it gives complete muscle relaxation

Slep 1 The patient is placed supine with the side of operation slightly elevated 5 or 10 degrees by one small pillow placed under the homolateral hip (Fig. 1) Fine black silk is used throughout A straight incision (Fig. 3) about 18 centimeters long is then made through the skin and subcutaneous itssues in the direction of the fibers of the external oblique muscle, 4 centimeters mesad to the anterior superior liac spine, and extending from the lower costal margin to midway between the anterior superior liac spine and the public spine. The fascia of the external oblique muscle is exposed, but no attempt is made to undercut the subcutaneous tissues.

From the Clinic of Sympathetic and Vascular Surgery Mount Zion Hospital San Francisco Surgical Service of Dr Harold Brunn Step 2 The external oblique muscle and fiscin are then split over the full extent of the incision in the direction of their fibers. The muscle is dissected carefully from the underlying internal oblique muscle, being careful to undercut only as much as is necessary to expose the line of split in the internal oblique. Retrictors are placed to expose the internal oblique at the desired site.

Step 3 (Fig. 4) The internal oblique muscle is then split in the direction of its fibers at such a point that the line of split points to the body of the second lumbar vertebra. The point is important in allowing exposure of the medial lumbo-costal arch because of the drig on the retrictors produced by the upper flap of the external oblique. The flaps are freed from the underlying closely attached transversalis muscle and fascia, and retractors are pinced so in evpose about

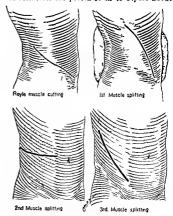


Fig I Incisions used in the Royle muscle cutting and the vanous muscle splitting approaches. Note the wide area of undercutting of skin and subcutaneous tissue in the first and second approaches. No undercutting is necessary in the final (third) muscle splitting operation.

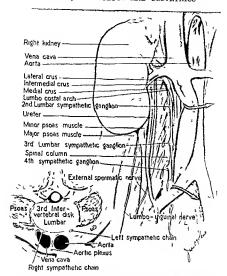


Fig 2 Important anatomical relations involved in lumbar ganglionectomy. Note that the second ganglion is the highest ganglion usually seen. The first ganglion is hidden under the musculature of the himbocostal arch. Also note that the raim of the second ganglion are directed rephaled whereas those of the third and fourth ganglia are directed canadad or transversely. The meet's shows the left symmathetic that the control of the second ganglia are directed under the second ganglia are directed to the sorts whereas the regist hypmathetic than line directly under the vena case.

15 centimeters of the latter at the level of the body of the third lumbar vertebra and in the direction of its fibers

Slep 4 (Fig. 5) The transversals muscle and its fascal continuation are split in the direction of their fibers for about 15 centimeters, the mesal limit being at the lateral border of the rectus sheath. The retropentioned fat is thus exposed In splitting this layer, care must be taken not to injure the pertionerum It is best to begin the split posternoity and to extend it carefully anternorty.

The peritoneum is the more easily torn as it nears the rectus sheath

Step 5 (Fig. 6) The retroperatoreal fat con tanung the ureter is then freed from the underlying issue with the hand. Care must be taken that the dissection is carried anterior to the fascial covering the quadratus lumborum and the psoas muscles. It is easy to carry the dissection deeply in the wrong plane if this is not borne in mind. The retroperationeal fat is dissected messad to the bodies of the vertebrae, cephalad to the crura of

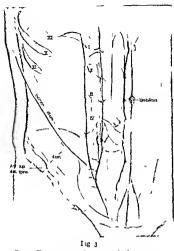


Fig 3 Skin incision and anatomical relations
Fig 4 The external oblique muscle and aponeurosis
have been split for the full length of the skin incision with
out undercutting the subcutaneous tissue The internal

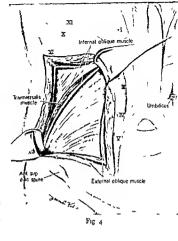
oblique muscle has been exposed and split in the direction of its fibers in a line pointing to the top of the second lumbar vertebra and from the iliac crest to the rectus sheath. The underlying transersalis muscle is thus exposed.

underlying tranversalis muscle is thus exposed
Fig 5 The external oblique and internal oblique muscles

have been retracted so as to expose the transversalis muscle. The latter has been split along its fibers for a distance of about 15 centimeters, the separation extending antenorly to the lattral margin of the rectus sheath. The retroperato neal fat is thus exposed.

the disphragm, and caudad to the him of the pelvis Retractors are useless until this is completed. A special retractor devised by Royle or a similar wide retractor is then inserted, and the parietal pertineum with the abdominal contents is retracted mesad. Another retractor may be used to draw the psoas muscle laterad, although this may not he necessary. A thin fascia covers the psoas muscle, great vessels, and sympathetic chain. This is opened and dissected free (Fig. 6).

On the left sade the sympathetic chain is found on the hodies of the vertehra, in the sulcus between the psoas muscle and the aorta. By moving the retractors caudad or cephalad the sympathetic chain can be exposed from the medial lumhocostal



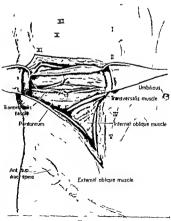


Fig 5

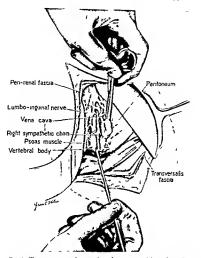


Fig. 6. The retropersioneal tissues have been separated from the under jung murdes, with the hand The Royle retractor is in place drawing the intact parietal persioneum messed. The sena case has been ferred of its ur rounding commercitie tissue mobilitied and drawn messed with the help of a bound drawn turn by a blomt book. At this less do more sees the third ganglion with the raum discreted transversely or caudial.

arch (Fig. 7) to the brim of the pelvis. Royle uses a special psoas retractor with blunt teeth. If this is employed one must be careful to avoid tearing the muscle, as this may result in troublesome bleeding.

On the right side the vena cava usually beed in cettly over the sympathetic chain. It is best to mobilize carefully this vessel over its entire abdominal extent before beginning the sympathetomy. This may be done with a mounted sponge. It is not wise to draw it aside with the Noble retactor for fear of injury to it or its branches. As the vena cava is drawn mesad, the chain and rander and are exposed. The gangloinated chain is intimately

bound to the fascia covering the vertebra: It must be freed from its attachments using fairly forceful dissection. The chain is toigh and taut, one of its most characteristic physical attributes. Small lumbar vens and arteries usually accompany the ram and pass anterior to it. These need not be divided. The chain may be drawn under them as the ram are severed, or the rami may be cut if necessary to facilitate its removal Ventuel beleding is encountered. If however, troublesome bleeding is encountered. If however, troublesome bleeding occurs in the depths and ligatures difficult is sher clips may be utilized. These have stood the author in good stead on several occasions.

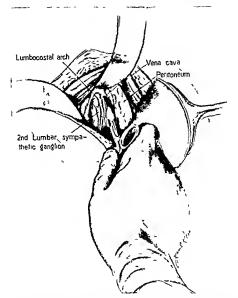


Fig. 7 The retractors have been moved cephalad. Another retractor Deaver type has been placed so as to expose the upper limit of the chain as it disappears under the medial lumbocostal arch. The vena cava has been further mobilized and held mesad. The highest ganghon seem is the second. The first ganglion lies under the insertion of the crura. Note that the tram connected to the second ganglion are directed sharply cephalad, a fact which allows of its tasy identification.

In identifying the sympathetic trunk we must be careful to distinguish it from the lumhar lymphatic vessels. An unusually low formation of the receptaculum chyli may make definition and mobilization of the trunk difficult. Small lumbar arteries must not be confused with rami communicantes. The abdominal trunk should he removed from above the second to helow the fourth ganglion, severing all the rami communicantes. The arrangement of the gangha is sometimes variable. Two adjacent gangha may be fused, or gangha may be mussing. The identification of the gangha depends primarily on which armi areattached to them rather than on their posi-

tion in relation to the vertebræ In this way fusion of two ganglia may definitely be diagnosed. The second ganglion may be identified by the fact that its rami are directed sharply cephalad, wherein the rami of the third and fourth ganglia are directed caudad or transversely (3) (Fig. 7)

Step 6 After the ganglionectomy and trunk resection the retractors are held in place while the entire field is washed thoroughly with warm saline solution. A large number of fat particles will float in the solution and should be removed. An hleeding points are ligated carefully. The retractors are then removed and the tissues allowed to fall together. It is unnecessary to change the

apparent that negative results balance positive findings and in the majority the methods used are entirely inadequate. The indirect evidence supporting the possibility of hyperadrenal emia as the causative factor in hypertension is more substantial. The syndrome associated with chromaffin cell tumors is now well established and the literature in this field bas been recently reviewed by Belt and Powell1 and Coller, Field, and Durant? Patients with these tumors have been found to display a paroxysmal hypertension together with other symptoms such as pallor, profuse sweating, dyspnea, headache, precordial oppression, brady cardia, nausea and comiting The origin of these tumors from the adrenal medulla. their histological appearance and brown stain ing after chromate fixation, the isolation from them of large amounts of comenhane, and the similarity of the symptoms of the paroxy smal attack with those produced by an injection of epinephrine suggest that a sudden excretion of adrenalin is the proximal cause of the hyper tension

Qualified opinion with respect to the function of the adrenal medulla is still far from agreement, and this in spite of an enormous amount of careful experimental work tonus theory assumes that there occurs a steads and continuous secretion of epinephrine into the circulation in amounts sufficient to provide a minimal but constant stimulation of sympathetic nerve endings As a result of this action on the vasoconstrictor nerves it is as sumed that epinephrine thus plays a role in the maintenance of the normal blood pressure A serious objection to the tonus theory arises from the fact that cats, dogs, and monkeys have been found to live indefinitely in good health after removal of one adrenal and com plete denervation of the other, an operation

which reduces the output of epinephrine to an undetectable amount Furthermore dogs and cats have been kept alive and in good condition after bilateral adrenalectomy by the ad ministration of cortical extracts free from comenhane This evidence would prove that the adrenal medulla and its product epineph rine performed no significant function were it not for the fact that a considerable amount of extra adrenal chromaffin tissue exists in vari ous parts of the body. The demonstration of epinephrine in paraganghomas arising from this tissue suggests that it has a functional capacity similar to the adrenal medulia A frequently stated objection to the tonus the ory, namely that minimum effective doses of epinephrine cause a fall rather than an increase in blood pressure and that when the dose is raised to a sufficient degree to produce pressor effects inhibition of the gastro intestinal tract results, bas been recently found to be un tenable. The depressor effect of small doses of epinephrine was demonstrated by C. A. Dragstedt, Wightman, and Huffman' to be due to the anesthesia and that if measure ments were made on the normal unanesthetized dog, the minimal effective dose of eninephrine on sustained intravenous miection caused an merease in blood pressure without inhibition of gastro intestinal motility. In recent expenments C 1 Dragstedt found that compatible suprarenal vein blood collected from one dog and remeeted into a second unanesthetized dor at the same rate at which it was collected produced a slight rise in blood pressure v hich was not secured by the injection of systemic blood. He concluded that the adrenals nor mally and constantly secrete epinephrine in amounts sufficient to modify the vascular bed and that a slight augmentation of secretion might easily produce hemodynamic effects

Relt A E and Powell T O Surg Gyrec & Obst 1034 50 P Coller F A Field H and Durant T M A ch Surg 1914 43 1130

^{*}Dragstedt C A. Wightman A H. and Huffman J W Am J Physiol 1923 84 307 Dragstedt C A J Am M Am 1923 or 1933

These observations provide very strong support to the tonus theory of mcdullo-adrenal function and at the same time remove some of the more formidable objections to the view that a hypersecretion of epinephrine may be the cause of hypertension A more or less critical test of the theory has been recently made in the writer's laboratory 1 A sustained hypertension for periods up to 2 weeks was produced in normal dogs by the continuous intravenous injection of epinephrine amount required, however, was sufficient to cause death from the other systemic effects of the hormone of which the inhibition of motility of the gastro-intestinal tract and the derangement in carhohydrate metaholism were prohably the most important Such findings make it appear very unlikely that long continued hypertension in man, in which the other systemic effects of epinephrine are usually absent, will he found to he due to hyperadronalemia The associated symptoms in cases of chromaffin cell tumors with paroxysmal hypertension have likewise heen so severe that it does not seem possible that a patient could survive the persistence of so serious an attack. For the moment then it seems wise that there be no widespread adoption of these proposed surgical procedures for the treatment of hypertension and that it be incumhent upon those who now carry them out to make careful and long continued postoperative studies which may be considered in the light of the natural history of the disease LESTER R DRAGSTEDT

CANCER OF THE BREAST

our campaign to control cancer of the breast. We have not decreased the death rate of the disease, and it has become doubtful that

HERE is an increasing murmur of disappointment over the results of

we can do so, in the near future, hy any means now at our disposal The results of our present day treatment are described as no better than Halsted obtained 40 years ago The time has come to review all the facts, both favorable and unfavorable to our management of breast cancer We need a restoration of faith in our well established methods of treatment The following considerations do this, even though they emphasize the unfavorable aspects of the situation

The death rate from cancer of the breast in the Registration Area of the United States in 1903 was 5 5 per 100,000, in 1933 it was 9 9 Were it not for the fact that vital statistics were kept rather carelessly 20 years ago, these figures would seem to show that the death rate from breast cancer has nearly doubled in that time Cancer of the breast is more easily recognized at death than any other common form of cancer The statistics on its frequency are therefore likely to be trustworthy There is no escape from the conclusion that it is at least as common a cause of death today as it was 2 decades ago, despite the intensive fight that has been waged against it This does not of necessity mean that the fight has done no good at all-only that its results are not yet shown by the mortality rate However, if the same criteria as to the success of measures designed to control an infectious disease are applied to the success of the measures beretofore used to control breast cancer, they indicate that the latter have accomplished next to nothing

The radical operation for operable cancer of the breast in well known clinics gives a percentage of from 32 to 39 of 5 year cures As Adair states, reports giving percentages much higher than these are to he looked on with sus-Diction There seems to be no hope of improving the radical operation or of increasing its extent

Senous attempts to treat breast cancer by irradiation have been made for perhaps 20 years The results of this treatment are not so well known as those of operation The tech nique has not been standardized. There is difference of opinion as to the relative value of high voltage x ray and radium treatment Breast cancer appears to he radioresistant and requires a dosage so heavy as to produce ulceration in some cases Many roentgenol ogists lack the courage to give it. Adair states that irradiation 'cures' are produced by loci ing up the disease in dense fibrous tissue, and starving the disease process by endartentia. and the direct insult to the cancer cell which is produced by the rays' He reports 12 five year survivals of a series of 37 operable cases treated by irradiation methods only, a per centage of 36 3. This is one of the very few carefully studied series of cases so treated which I have been able to find. It is probable that these patients received about as good treatment as is possible in the present state of knowledge, and that the 363 per cent of 5 year cures is about the best that can be ex pected from irradiation alone. The same author reports 40 6 per cent of 5 year cures among 137 cases treated by combined opera tion and irradiation

It is significant that the percentage of 5 year cures obtained by irradiation as the sole method of treatment is about the same as that obtained by operation alone. It is also significant that very few authorities on ir radiation advocate it for operable cases except in combination with the radical operation. The writer has seen cases in which irradiation seemed to hasten the spread of the growth, also cases in which it caused a rapid disappear ance of metastatic nodules. In nearly all cases irradiation will alleviate the pain of spinal metastases.

It is the usual experience of surgeons now-

adays that their patients die with no, or com paratively insignificant, recurrences in the field of operation. They die of internal metastases. Primary tumors, found with difficulty at autops, may produce massive and widespread metastases. Metastases may be found 15, 20, even 43 years after operation. Absolute proof of cure can be obtained only by autops. Some growths cause death within a period of 3 months.

Daland has shown that of 100 cases of un treated cancer of the breast 26 were hving after years The term 'early case' is hable to be a misnomer. With improved methods and a diligent search we have been able to find axillary metastases in nearly all our apparently early cases From all this it is evident that the vital characteristics of cancer of the breast are extremely variable. We must agree to the dictum that the fate of the patient is sealed before she comes to operation. Neither by operation nor by irradiation can we hope to destroy more than the local growth and its remonal ramifications Early operation is better than late operation but early operation is not so much better as we once thought it to be

The foregoing facts must soher our thoughts regarding breast cancer, but they should not in the least destroy faith in our treatment of it. They warrant the following conclusions.

- r That radical operation combined with irradiation or alone will in nearly all cases nd the patient of the horior of the local growth. We now seldom see foul ulcerating tumors fixed to or invading the chest wall. Even if treatment produced no permanent cures at all it would still be a great hiessing.
- 2 That in at least 33 per cent of all cases the vital characteristics of the growth so limit it that fairly early operation will be followed by survival for 5 years or longer

They do not justify half hearted or perfunctory treatment, which we know by ample experience is worse than no treatment at all. The results of treating breast cancer are as good as those obtained by treating cancer of the cervix, and infinitely better than those

obtained by treating cancer of the stomach We can hope for some improvement of our results from better methods of irradiation, but for any great improvement we must await fundamental scientific discoveries

W D GATCH

MASTER SURGEONS OF AMERICA

ARCHIBALD CUNNINGHAM HARRISON

ORN near Richmond, Virginia, January 6, 1864, Dr. Harrison was fortunate in his parents and lineage, but unfortunate in the time and location of his burth, his mother at the time having been forced to leave her home hecause of Civil War battles in the neighborhood. Like many of his contemporaries from the South, the Civil War and Reconstruction Period prevented him from having the advantages he otherwise would have had. This is made the more easily understood by a visit to his boshood home which, at one time, was occupied by Union troops and which is in a neighborhood where there was much heavy tighting. Here Stuart made some of his most dashing maneuvers and a few miles distant stand the handsome and lamous Seven Piers.

On his father's side he was descended from a long line of distinguished ancestors including Benjamin Harrison, Councillor Robert ("King") Carter, Archibald Cary, and the original Wilham Randolph. His mother was the daughter of Benjamin Watkins Leigh, noted lawyer and political figure of his time, and Julia Wickham, granddaughter of John Wickham, the lawyer who defended Aaron Burr. Dr. Harrison's father was Dr. Thomas Randolph Harrison, a physician of varied knowledge, great resource, and with many of the characteristics later seen in his distinguished son. Though a country doctor without facilities, he was remarkably successful in surgery, and it was his enthusiasm and success that influenced the son to be a surgeon. The son also inherited the father's love for natural history.

Julia Wickham Leigh, his mother, was a woman of fine force of character and known for her large fund of information, the result of unusually wide reading

Dr Harnson's early education was obtained in a log cabin public school, a private school near his home, one year in a boarding school at Winchester, kentucky, and one year at Hanover Academy, Virginia His medical education was obtained at the University of Virginia and the University of Maryland. He was graduated at the latter school in 1887. Upon graduation, he was appointed interne at Bay View Hospital (now The City Hospitals) and when the Johns Hopkinis Medical School opened, he worked for a short time in its dispensity under Dr Halsted. Though this connection was brief, it aroused in him an admiration for Dr Halsted and his work that constantly increased, was a constant inspiration, and undoubtedly influenced his conception of surgery as did his vork under Dr L. McLane Tiffany.

kapininanana <u>arakalaninten mananan manya manya anakakan</u>



Archibald C Harrison 1864-1926



Feeling that he had to obtain a living wage quicker than he saw opportunity of doing in Baltimore, in 1890 he went to Meyersdale, Pennsylvania, and did general practice there until 1898. During this period, he did all the surgery that came to his hand, but ever with a desire to get back to Baltimore and a larger field with greater opportunities for development. Tinally the temptation could be withstood no longer and he returned to start afresh at the age of 34 years. In 1892, Dr. Harrison married Anna Warfield of Howard County, Maryland By this marriage, there were three daughters. The relationship that existed in this happy family was an ideal one. In the working world, his hands were not always gloved, but in his home, he was the ultimate in gentleness, consideration, and good humor.

Promptly after his return to Baltimore, Dr. Harrison took up the study of anatomy, and night after night worked in the dissecting room at the College of Physicians and Surgeons until two or three o'clock in the morning. His industry and his knowledge of anatomy soon obtained for him the position of an assistant demonstrator, and in a few years it was recognized that he had mastered anatomy as few surgeons do

In 1901, he was made demonstrator of anatomy, and in 1902 was put upon the visiting staffs of surgeons of Mercy and Bay View Hospitals, thus giving him also some clinical opportunities. In 1903, he was made associate professor of surgery and anatomy. In 1908, he was made professor of anatomy and clinical surgery, and in 1913, professor of surgery. In 1915, the College of Physicians and Surgeons combined with the University of Maryland and he retained his last title until his death. In 1908, he was made a visiting surgeon to St. Joseph's Hospital and after this, there followed appointments to the staffs of the Church Home and Infirmary, the Hospital for the Women of Maryland, the Baltimore Eye, Ear and Throat Hospital, and the South Baltimore General Hospital

Dr Harrison was peculiarly fitted by nature to be a surgeon His appearance, his calmness, his carefulness, thoroughness, resource, courage, and judgment were a foundation upon which he built by hard work, careful preparation, and deep thought

The excellent courses given in the primary subjects of medicine at the University of Virginia, particularly in anatomy, the clinical work he saw at the University of Maryland and Bay View, the miscellaneous work he had in general practice, his training in the dissecting room, the clinical facilities he was given, were all made the most of and were seed sown upon fertile soil, so that when his larger opportunity came, it found him prepared with an excellent ground work

Dr Harrison's knowledge of anatomy plus his calm, deliberate manner of operating and his perfect technique, enabled him to do surgery with a precision and exactness rarely equalled The ordinary operations that he did repeatedly were done splendidly—one feels like saying perfectly—but it was in the extraor-

dinary procedures that he shone most brilliantly. Given a condition for which no definite operative procedure was described, he took pleasure in thinking out a method and line of approach and would carry through the operation, nearly always just as he had planned it. In his vigorous years, he seemed to revol in difficult operations and particularly in those requiring careful anatomical dissection.

As a surgeon, he deserves the highest rank. As a diagnostician, he shone not only in surgical conditions, but medical conditions as well, making his advice particularly valuable in puzzling, borderline cases. A large part of his diagnostic ribility was due to his unusual skill in obtaining the patient's history. As an operator he had few equals—the same thoroughness and care observed in the diagnosis were used here. He admired the painstaking, deliberate type of surgeon and was bitter against the operator who tried to be rapid, at the sacrifice of technique and a regard for tissues.

Perhaps Dr Harrison's greatest service to his profession and the public was bis firm stand for this type of surger. Who can say how far this influence is felf. There are surgeons taught by bim as students and internes practicing mail parts of the Union. He had a very high ideal in surgery and he came nearer to his ideal than falls to the lot of most men. The exactoess and neatness of his work, plus the beautiful exposures and careful dissections, made his operating taxing and tiring, but he lived up to his ideal or deviated from it only when speed was absolutely essential. Then, contrary to the opinion of many, he could work quite rapidly.

In certain types of work, for instance, bone surger, or large difficult dissections, like tumors of the neck, law or tongue, and many other conditions, the writer has not seen his superior in any clinic. In postoperative treatment he gave his time unsparingly—was skillful and resourceful

Dr Harrison had, in a remarkable degree, the power to separate the wheat from the chaff in surgical measures and could almost unfailingly pick out among the new suggestions, the ones that would last and the ones that would be discarded. He was not a research worker, but his ability to sift confusing and complex evidence and to arrive at a clear, concrete verdict was well known and his advice and judgment were constantly sought by surgeons and practitioners and frequently by lawyers who had medicolegal problems. By a large group of younger men, he was consulted firely regarding all manner of problems, and his advice was always logical and clear. As in the home, so with his patients he was gentleness itself—particularly with women and children and the very ill, but woe to the man who was a coward of a malingeret?

It is a pleasure to remember the many pleasing and admirable characteristics of Dr. Harrison—his personal attractiveous, his honesty and integrity, his courage, his humor, his forthrightness (and, upon justification, his ferociousness)

As a man he met things squarely, and of those who did not, he was, particularly in his later years, somewhat critical. When this is said, the indictment of faults is complete, and it might be said in extenuation that many of his estimates were, in due time, found to be true. His eriticisms, however, were limited to man. He bad a great love of animals and he knew a great deal about them, as he did also about trees and about birds. He had unlimited admiration for nature and for her laws.

His achievements are the more to be admired when it is realized that his surgical eareer was really a short one. He returned to Baltimore in 1898. It necessarily took him a few years to obtain a foothold and his work, like that of many others, was seriously interrupted hy going overseas in 1917. After his return in 1918, he accomplished a great deal, but he knew his cardiac condition had to be favored and he did not evert himself as he had previously done.

The period of 1906 to 1917 was the flood tide of his career. During this time, he accomplished an enormous amount of work, but no matter how rushed he was, how many operations he had posted, each one had to be done as though it were the only one posted that day

Though it was always difficult to persuade him to write, in these years, he appeared rather frequently before medical organizations, and in 1906 was elected president of the Baltimore City Medical Society and in 1913 was made president of the Medical and Chirurgical Faculty of Maryland

When America entered the war, Dr Harrison promptly offered his services by going to Washington and asking to be allowed to organize a small mobile unit of some type This offer was refused and the refusal led him to make some statements to the then Chief of the Red Cross that made the writer, who was present. feel rather uneasy, but apparently no offense was taken, for he was urged to organize a Base Hospital which he, at the time, thought could not be done. It is another instance of the clearness of his judgment that the type of unit he wanted to organize was eventually found to be essential and Base Hospitals were largely hroken up to form such teams Later, the University of Maryland Unit was organized as Base Hospital No 42 with Dr Harrison as director At this time he was given the rank of Major, later he was made a Lieutenant Colonel and after the War he entered the Reserve as a Colonel Organizing and commanding Base Hospital No 42 and doing such excellent work ahroad was considered by his friends as heing an outstanding achievement, but he rarely referred to it and never once mentioned any hardships or stress that he must have undergone When he found himself in failing health, he never intimated that the War had anything to do with it, except to say he thought an attack of influenza, suffered while in France, had done him harm After he returned to this country he received a citation from General Pershing for "especially mentorious and conspicuous service at Base Hospital No 42, France "

Dr Harrison was a strikingly handsome man, of a large upstanding figure and a commanding presence. In his youth and early manhood, he was very athletic, heing a good swimmer, a crack shot and so successful in a mattern haseball that he was offered a position on a professional team. Possessing a keen sense of humor, heing quick at repartee, a good story teller and having a great fund of accurate information, made him a most entertaining and instructive conversationalist. He was a great lover of nature and no recreation was so pleasing to him as roaming through the woods or fields, observing the hirds, trees, and animals about which he knew so much

Though always having the desire for it, extensive general reading was to a large extent denied him in the years when he was developing himself as a surgeon, but in later years, this pleasure came to him in full measure. He read discriminatingly, extensively, and in the same manner that he had read surgery, slowly, carefully, with deep insight and by no means always accepting the author's conclusions.

His father, having lived to the age of \$1 and his mother to the age of \$7, the life expectance of Dr. Harrison should have been more than the allotted three score years and ten, but his trage death occurred a few days after the completion of his sixty second year. In his passing, his immediate family and large family connection lost their ido! The surgical profession lost a clear thinker, a lucid teacher, a master surgeon

He, "in every storm of life was oak and rock, but in the sunshine, he was vine and flower." Walter D Wiss

LANDMARKS IN SURGERY

TROUSSEAU AND THORACENTESIS

IEROME R HEAD, AM, MD, Chicago, Illinois

YN 1863 in his "Chinique Médicale de l'Hôtel Dieu," Armand Trousseau summed up his contributions to the operation of thoracentesis in a passage which is a unique and dignified expression of man's desire to have contributed permanently to the nork to which he has devoted himself

"One will render me, I hope, this justice," he wrote, "that I rarely speak of myself and that for my part I generally attach little

importance to questions of pri only I may then once in passing give to my self the credit due me in the matter of paracentesis of the chest I make no pretension to having conceived it. I have invented no special instrument to facilitate the operation, I have not advised any operative procedure which was not already perfectly well known, but I beheve that I was, if not the first, at least one of the first, to have formulated the necessity of paracentesis of pleurisies with excessive effusion. I established with precision, perhaps with more precision than any one hefore me, the indications, and finally, I heheve that I popularized a method which has now been generally adopted For these reasons I consider that I have con tributed somewhat to the progress of the treatment of pleunsy"

Trousseau read his first communication on paracentesis for pleurisy with exces-

sive effusion before the academy of medicine of Paris in 1843, and the year following cited additional cases

Trousseau's rôle in the development was that of the climician and the popularizer. He stressed the fact that pleurisy with excessive effusion was frequently the cause of sudden death from pulmonary embolism and that chronic persistent effusions occasionally left the lung permanently crippled and the thorax distorted. He noted that dyspnea was a misleading symptom, frequently being absent in the presence of large and dangerous accumulations He said that the entrance of air was not to be feared, nor the rapid withdrawal of large amounts of fluid He did not realize that he could safely do the latter only because he permitted air to equalize the pressure

The indications for thoracentesis came gradually to be recognized, and then, as is so often the case, to he extended and abused

Gradually the pendulum swung back. Aspiration today is done diagnostically or only for excessive effusions or those unduly chronic Sudden death

from embolism, and calcification of the pleura, are the complications it can and should prevent Recognition of the facts that most simple pleurisies are tuberculous and that collapse of the lungs favors the healing of the hasic pulmonary lesion has led men to regard the effusion as of therapeutic value and in some instances, when the causative pulmonary tuherculosis is at all advanced, to prolong the collapse which the fluid has initia ted by replacing it with air

During the middle decades

of the 19th century, Armand Trousseau was the foremost teacher, clinician, and consultant in Paris Paris and Duhlin were then the medical centers of the At a time when the theory and practice of medicine were undergoing revolutionary changes, he was the chief advocate of the new order and his clinics at l'Hôtel Dieu, attended

he students and physicians from all nations, hecame a fountain head whence the hest and latest in medical thought was disseminated throughout the world And yet this man whose career was so hrilliant, who in his own right won and filled the highest position in his profession, cannot be considered-in fact never considered himself-as more or greater than the pupil of a greater man Nowhere in medical literature is there an example of a more ideal relationship between master and pupil than was that between Bretonneau and his disciples, Trousseau and Velpeau

Much that men do is done to justify the expectations of those whom they love and respect, and Bretonneau, one of the truly great physicians, had the



The Figure of an actuall content with its plate fit to be uled in a Plearific

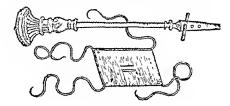


Fig 2 Instrument

rare quality of inspiring such devotion. Throughout his life Trousseau lived to justify the hopes this man had for him writing to him regularly of his work. plans hopes problems and in his chines preaching his doctrines and popularizing his achier ements

Trousseau's first meeting with Bretonneau de termined the course of his subsequent career. At the age of twenty having completed his studies at the Lycee d Oricans and the College of Lyons he had attained the position of professor of rhetoric at the College of Chateaurous Shortly after receiving this appointment he chanced to meet Bretonneau at the home of a friend. A mutual sympathy and apprecia tion must immediately have been discovered for at the end of their first conversation the older man urged Trousseau to shandon teaching and study medicine Trousseau followed the advice and the next two years spent on Bretonneau's service at At this time writes Gomez 'when Bre tonneau by his studies had already arrived at an understanding of diphtheria and typhoid fever he became his favorite pupil the assistant in his work the depository of his hopes the witness of his suc-Trousseau filled himself with the ideas of his master and assimilated his doctribes and it was these which he carried with him to Paris and which presented with his natural eloquence and communi cative arder revolutionized medical thought and were the source of his reputation and of the origi nabity of his teachings

In 1825 Trousseau proceeded to Pans to continue his studies and to take his examinations for the doctorate Having passed these and completed his thesis he wrote to Bretonneau I received the most flattering compliments from M Recamier and M Guersant and I trust therefore that I have shown myself not less worthy of you than Velpeau and Cot tereau" At this period as throughout his hie his own success seemed important chiefly because it

pleased and justified his master

graduation are the most difficult and important They were for Trousseau He lacked money to con timue his studies and was faced with the important problem of choosing a location for practice and de ciding on the direction of his career Velpeau per suaded him to take the examinations for admission to the faculty. It was a question of remaining in Paris and following the hard road of ambition or of returning to Tours and its easier and more pleasant mays He wrote to Bretonneau If I am turned down perhaps it will be for the best of I am chosen perhaps that will be even better. The road of am bition heing opened to me I shall harl myself into it with fury and in spite of all obstacles it may be that I shall arrive But if the door of the school is

closed to me I shall consider myself quite happy to

return to the depths of my province and there pass

more good moments in six months than in ten years

in this more brilliant theatre

For every medical student the years following

He finally decided that whether he was received or not he would return to Tours Bretonneau wrote to him. What madness has taken possession of you to bury yourself in this hospital when so fair and noble a career is open to you? To this Trousseau replied, 'I see it all clearly I shall be appointed an agregé I shall sacrifice all to my reputation, to my advancement and in fifteen years I shall be one of the twenty two professors of our faculty. I shall be forty years old my life three fourths used, I shall know nothing of medicine and shall begin to acquire a chentele I shall be quite satisfied and quite glon ous And my happiness my dear master? You smile? What difference does that make?

At Trousseau a continued solicitations Bretonneau secured for him the appointment as a surgeon at the hospital of Tours And then when all was appar entily decided Trousseau passed his examination and determined to remain in Paris Bretonneau was irri tated and hurt Permit me, he wrote, 'A reflection

which is authorized by the paternal affection which I bear you and by my experience of life, the most important part of a man, that which is of the most intrinse value, is neither his ability, his knowledge, or his talent, it is his character."

This was in 1826 The struggles that Trousseau had anticipated in Paris became real and it was not until 1839 when he was thirty eight years old, that he finally secured the chair of therapeutics. In 1852 he reached the goal of his ambition and was up pointed chief of the Clinique Médicale de l'Hotel Dieu One can believe that the dissipation of his energies irked him and that at times be grew "tired of knocking at preferment's door " When he had finally arrived, as be felt certain that he would, he could still write to Bretonneau in the tone of his earliest letters, "as the years pass, my life arranges itself more and more unsatisfactorily and I am now hurled into a medical whirlpool which prevents me from being a physician However much I wish to escape from the distractions of the role, I am caught in the gears and all passes. The compensations of self esteem and money are little in comparison to the ennut which it all causes me, and I realize that no escape is possible save one that is complete. I light, paralysis or death-those are my three ports of refuge, and it is not gay -- "

In 1863 be resigned from his position at l'Hotel Dieu and again took the chair of therapeutics. In 1866 he relinquished this also. It is probable that he already felt the beginnings of his last illness, for on June 23, 1867, after a long and painful decline, he died of cancer of the stomach Bretonneau had preceded him by only four years and Velpeau followed him in a few months

Trousseau contributed greatly to the progress of medicine in the 10th century—not by his original contributions, for these were negligible—but by his persistent, impressioned, and successful advocacy of the new ideas of other men. Most of these he had obtained from Bretonneau, a few, like thoracentesis, he acounted elsewhere.

Had Trousseau returned to Tours instead of remaining in Paris, it is possible that he would have contributed originally to medicine and come nearer to realizing his true ambitions. The strife and distractions incident to winning preferment in a great center are rarely conducive to original thought. But be that as it may, his energy and talents were exactly suited to the role he chose. His enthusiasm, his courage his gift of rhctoric combined to make him the popularizer par excellence, and it is as the disciple of Bretonneau and the advocate of the ideas of other men that he must be remembered. To say this is not to dispraise him. In all phases of buman activity such men are important and indispensable, for were it not for their imagination in recognizing the good in the new work of others and their energy in demonstrating and proclaiming it, progress would be seriously delayed

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REVIEWS OF NEW BOOKS

HE technique of urography the normal and all the abnormal conditions of the urinary tract. are covered in the manual on urological roent genology by Wesson and Ruggles In order to develon a logical basis for the roentgenological findings each condition is discussed briefly but concisely with the excellent illustrations such a scheme of discussion makes this a practical handbook

The authors introduce a rather unique method of combined retrograde cystoscopy and ureteral catheterization with intravenous prography after the ureteral catheters are passed their ends are plugged and the intravenous urographical material is administered and roentgenographical studies are made at stated intervals. If unsatisfactory plates are obtained retrograde urography is executed. The authors recommend an absolute use of the gravity method for the injection of the upper urinary tract with media. They helieve, as most urologists do, that retrograde urography is still more valuable than

intravenous urography

The chapter embodying a discussion and illustra tion of urogenital infections is particularly clucidat ing and outstanding, urinary tuberculosis is cor rectly given a most important place. Renal tumors afford the opportunity for an excellent discussion and display of roentgenological studies Trauma tism of the urinary tract and the principles which govern their roentgenological studies is expertly discussed the authors have apparently had much

experience with this group of urological patients This practical manual can he recommended to medical students and practitioners whole beartedly Most urologists would do well to read the book too

WILLIAM T BAKER

A FAIRLY complete review of the modern stage of gynecological radiotherapy is given in a recent monograph2 written by the radiologist of the Centre Anticancereux in Bordeaux which is one of the greatest cancer centers in France

After a brief chapter on the physics and biology of gynecological radiotherapy and of the most im portant clinical facts to he considered in its applica tion the radiation treatment of henign lesions of the female generative organs is discussed, including the treatment of functional disturbances After a short chapter on the radiation treatment of inflammatory conditions of the female genital organs the largest part of the remainder of the book is devoted to the

IUSOLOGICAL ROENTGENOLOGY A MANUAL FOR STUDENTS AND PRAC THEOTESS By Miley B WESSON IN D and Howard E Reggles IN D Philadelpha Lea & Feb. per 1000000 C CURE TR ROENTGENOLOGY FRANCOTHEAUTE CONSTRUCTION COLUMN TRANSPORTED BY R MARTIN COTTANT PARK Mission et Cr. 1916

treatment of malignant tumors. A final chapter deals with the radiation treatment of cancer of the

For those who read French this book is a convenient guide for information as to the present conditions of the application of radium in the different diseases of the female genital organs, of their indica tions and limitations. Its tenor is inspired by the leading ideas of the French school although the author also discusses some of the modern foreign

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The book is completely brought up to date Some times one has the impression that it is too modern. in so far as it includes methods whose definite value

is not yet definitely established

In general this hook gives a very good survey of the indications and limitations of radiation therapy in these conditions Especially the discussion of the treatment of cancer of the uterus can be endorsed in every detail. It is valuable to have the scattered information of the results of radiation therapy of cancer of the cervix in leading radiologic clinics in their comparison to surgical results collected here in a convenient form. In addition to the value of this book as a convenient source of brief information about the questions related to gynecological radio therapy the possibility that it may advance the knowledge of the facts of the accomplishments of radiotherapy in these conditions greatly enhances its original worth. In no country are these facts well enough known and certainly not enough appre ciated by many of the surgical gynecologists

There is an extensive bibliography appended

MAX CUILER.

THE author H Jessen dedicates his work! on cytology of the cerebrospinal fluid to Paul Ravaut whom he calls the father of the cytology of the cerebrospinal fluid The hook is divided

* Cytologie du liquide cépealo-bachdien normal cher l'houme novocrapsie crifique et pratique By H Jessed Paris Masson et Cie. 1936

into three parts, morphology, enumeration, and cytophysiology All discussion is limited to normal fluid Jessen describes the methods of studying the cells, immediate or delayed, with or without centri fugation, or by precipitation in their natural state or after fixing and staining as in hematology, or by the "vital" or "supravital" methods To study the cells in detail he recommends the Alzheimer, Ravaut. Forster, Cunningham-Kubie, Einstein Ostertag, and the Fischer, Kafka, Jessen techniques, pointing out that all have defects and limitations He concludes that in the cerebrospinal fluid one finds only mono nuclear cells, polymorphonuclears, and that others are rare and accidental The mononuclears consist of small round cells, large round cells, polygonal cells, and intermediary forms The first type is preponderant in number Jessen indicates that these cells undergo cytolysis in ii o as well as in vitro, the rate in any one individual varying. This explains the variability in reported counts

To study the number of cells in the normal patient, the author uses large series, examining quantities of fluid in a Glaubermann chamber which contains a volume of 20 cubic millimeters. He points out the danger of gross error in smaller chambers and ad vises not coloring the fluid for the count, but adding, formalin to preserve the cells (1 part to 10 parts of fluid to make a 5 per cent dilution). The author considers up to 5 cells per cubic millimeter as normal; 5 to 10 as suspicious, and over 10 as pathological.

As for the origin of the cells, he indicates that the fluid is principally a secretion from the cerebral ventricles and that there are few if any cells there An admirture of cells occurs as the fluid descends the arachnoid sac This is "easily understood" be cause the cerebrospinal cavity has n large surface, and is traversed by trabeculæ rich in cells Condi tions are optimum for an admixture of cells into the fluid as it passes downward. As indicated before, the cells are chiefly lymphocytes, although others may he epithelial cells or histocytes. The author believes that the cells are accidental elements in the fluid and serve no physiological function. There is no normal "threshold" for these cells, the limit be tween the normal and a pathological pleocytosis heing variable. Jessen warns that what may be normal for one, may he ahnormal for another, despite the general rules, and that all the other findings, the Wassermann, protein studies etc , must be considered hefore deciding that a given pleocytosis is significant

In general it may he said that the author has offered little that is new except to emphasize certain cautions, especially as regards the importance of studying the formalin fixed cells in a large chamber Of value is a good review of the literature and a critical evaluation of the various methods of study

of the cytology of the cerebrospinal fluid An excellent bibliography on the subject of cerebrospinal fluid, comprising 20 pages, is appended to the volume BENJAMIN BOSHES

WITH the recent increase in the clinical knowledge and surgical treatment of diseases of the thorax, there has developed a need on the part of both the physician and the surgeon for a more detailed consideration of thoracic anatomy than is afforded by general texts and atlases Le Thorax,1 by Hovelacque, Monod, and Evrard, meets this requirement Besides being an excellently illustrated descriptive text, it presents adequate discussion of controversial theoretical points and of all variations from the normal The illustrations, which are the most important and practical part of any work on anatomy, are in the best traditions of the art and are so numerous that there is scarcely an area that is not depicted from many angles. As a reference book it should he of constant service to the physi cian, the surgeon or the roentgenologist who is working in the field TEROME R HEAD

AN ADMIRABLE guide for undergraduntes, A house surgeons, and young graduates in practice is provided in Operatine Surgery, by Miles and Wilkie I in this, the second edition, the text has been brought up to date With the mid of their conduitors, Miles and Wilkie have presented a condensed and forceful picture of the present day practice in the Edinburgh School. As each page contains the valued observations and advice of experienced and necomplished surgeons, it will also be read with interest and profit by more mature surgeons. While no pretense is made for completeness, all the more common operations are described. The 329 illustrations are graphic and informative. The short summaries of the regional anatomy are excellent indeed.

In such a worthwhile book as this, it would seem poor taste for the reviewer to pick out very minor points for adverse criticism. None the less it is to be hoped that the description of direct blood transfusion by metal cannula from donor to patient will be omitted from the next edition. The reviewer regretted not finding mention of the Orr treatment of osteomyelitis and was somewhat pained at the idea of giving calomel or castor oil on the third day after an abdominal operation.

Miles' and Wilkie's Operative Surgery is a useful and valuable book and can confidently be recommended

FREDERICK CHRISTOPIER

LE TRORAX ANATOMIC MEDICIN-CHIEURCICALE By Pr Hovelacque Oliver Monod and Henri Evrard Paris Libraire Valsime 1917.

GOTERATURE SERVERY BY Alexander Valles MD LLD FRCS (Ed and D P D Wilkie M.D FRCS (Ed and Fng) 2d ed London Oxford University Fress 1936

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Cytologie du liquide céphalo-bachidien normal chef l soudit onochaphie chifique et pratique. By H Jessen Paris Masson et Cie. 1956

^{*}Undocical Reenterology a Martal for Styden's and Prac thiorysis. By Muly B Wesson M D. and Howard E. Roggles M D. Philadelpha. Lad Reb et 1930 *Redigitation Gynecologyse. Cere mt Roenterheterie By R. Stately Comat. Fars. Masson et Cie. 1930

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

EUGEYE H POOL, New York, President FREOFRIC A Besley, Waukegan, President Elect VERNON C DAVIO, Chairman, Michael L Mason, Secretary, Committee on Arrangements

PRELIMINARY PROGRAM FOR THE 1937 CLINICAL CONGRESS IN CHICAGO

In the following pages there appears a preliminary schedule of operative clinics and demonstrations at the hospitals and medical schools as prepared by the Committee on Arrangements for the twenty seventh annual Clinical Congress of the American College of Surgeons to be held in Chicago, October 35-30. It will be noted that clinics are being arranged for the afternoon of Monday, October 25, and for the mornings and afternoons of each of the four following days Published in tentative form at this time, the clinical program will be revised and amplified during the months preceding the Congress.

In addition to an ample and well-arranged schedule of operative climics that will demonstrate the technique of a wide variety of surgical procedures, the Committee is arranging a series of demonstration climics at the medical schools and in the larger hospitals for the presentation of work bung done in many special fields such as neurosurgery, traumatic surgery, thoracic surgery, fractures, plastic surgery, cancer, orthopedics, genito-uniary surgery, obsertions and gy necology, phy-

The Committee expects to so correlate the program that the visiting surgeon may be assured of an opportunity to devote his time continuously, if he so wishes, to clinics dealing particularly with the special subjects in which he is most interested For example, it is planned to arrange so that fracture clinics will be available each forenoon and afternoon during the Congress, and similarly clinics and demonstrations in many special subjects

sical therapy, roentgenology, etc

The surgeons of Chicago, under the leadership of a strong and representative Committee, expect to provide a program of clinics and demonstrations that will present a Complete showing of the clinical activities in all departments of surgery in this great medical center

The Committee is assured of the hearty cooperation of the clinicians at the five medical schools and more than fifty hospitals that will participate in the clinical program

The Executive Committee in charge of arrangements is as follows

VERNOY C DAVID,
Chairmon
MICHAEL L MASON,
Secretary
FRED I ADMR
RALPH B BETTIM
LEPANDER BENSCHWIC
FRIDERIC, CHRISTOPHER
WYREY H COLF
FDWARD L COMPERT
JOHN S COULTER
WILLIAM R CUBBINS
HARRY CHUYER

LOVAL DAVIS
GFOREP DETARNOUS EN
LESTER R DRAGSTEDT
HARRY S GRUDLT
M J HOBERY
SELLE W MCARTILLE
KNELA MYSLE
ALBERT H MONTONLRY
OCAR I NADIAU
DALLAS B PHEMISTER
SAMUEL SALINGER
C F SAMYER

In addition to an extensive schedule of operative clinics and demonstrations at the hospitals prepared by the sub-committees on ophthalmology and otolaryngology, it is planned to arrange for two evening sessions at the Stevens Hotel at which visiting ophthalmologists and otolaryngologists will present and discuss papers of interest to those who specialize in these particular fields

In the following pages will be found a preliminary outline of the programs for the scientific sessions to be held each evening in the balfroom of the Stevens Hotel, as prepared by the Executive Committee of the Board of Regents At the opening session on Monday evening the retiring president, Dr. Eugene H. Pool, of New York, will deliver the presidential address and inaugurate the new officers—Dr. Frederic A. Besley, of Waukegan, president, Dr. Frank W. Lynch, of San Francisco, and Dr. Austin B. Schinbein, of Vancouver, vice-presidents. Also at this session the 1937 class of initiates will be received into Fellowship in the College.

As they so faithfully depict clinical features of major interest to surgeons, the showing of surgical motion picture films will be continued at this year's session with an enlarged program of both sound and silent pictures to be exhibited dails at headquarters

Headquarters for the Congress will be estabhished at the Stevens Hotel where the grand ballroom with its large fovers and other meeting rooms on the second and third floors have been reserved for scientific sessions and conferences

The Technical Exhibition will be located in the Fishbition Hull in which will be placed the registration and climic ticket bureaus and the bulletin boards on which the daily clinical program will be posted each afternoon for the following day Leading manufacturers of surgical instruments is ray apparatus, operating room lights, hospital apparatus and supplies of all linds ligatures dressings, pharmaceuticals and publishers of med ical books will be represented.

AFTERNOON SESSIONS

A senes of five conferences to be held at head quarters has been planned for the afternoons of Tuesday Wednesday Thursday and Friday

On Tuesdas afternoon under the auspices of the Committee on the Treatment of Malaguan Diseases, a cancer symposium will be held, deal ing largels with scientific and chinical phases of the cancer problem rather than with organization and administrative problems. In important phase of this conference will be the presentation of five year cures on cancer that will have been completed by the Department of Chinical Re-earch from statistics furnished by surgeons, pathologists and radiologists as individuals or as members of his pitals and clinics. Added to the 24,440 five var cures reported by the College in 1934 the figures to be presented should reach an imposing magnitude.

On Wednesday aftermoon there will be two symposa, one devoted to obsetters and gynecol ogy and one to graduate training for surger. In the former there will be presented papers dealing with the clinical phases of obstetrical and gyne cological work which will be of interest not only to those who contine their work to these special fields but also to those whose general work leads them into these fields. Leaders in these special ties have expressed an interest in this symposium that insures its educational value.

The st imposium on graduate training for surgery will be devoted to a discussion in which representatives of several interested organizations will participate. As this subject is closely related to the requirements for fellowship in the College, the program will be of particular interest to affective Fellows. The College has given this subject close

study during the past six years. Many other organizations are interested and it is hoped that this conference will afford an opportunity for the pooling of all available information Following the pre-entation of papers dealing with various aspects of the subject there will be a general discussion to bring out the viewpoints of the surgeon in the large teaching hospital, the non teaching hospital and the community or rural hospital Other interested organizations the American Medical Association the American Board on Sur gers the American Surgical Association and oth ers have been invited to present their viewpoints Supplementing these discussions, the findings of the 1037 survey of hospitals in the United States and Canada by the American College of Surgeons

will be presented On Thursday afternoon, under the auspices of the Committee on Industrial Medicine and Trau matic Surgery the symposium on industrial med icine and traumatic surgers will be confined to subjects that are of special interest to those who practice medical service in industry. Naturally, these subjects will include features that are of paramount interest to all surgeons today because of the important role that the treatment of injuries has assumed as a result of our widespread mechanization and the development of hitherto un known degrees of force. There is a demand made on the surgical profession to develop and perfect methods of bandling the more terrine miures to all parts of the body. It is expected that in this symposium some of these methods will be presented Reports will be presented of the year's The interest of surgeons in industry will be maintained through the following after noon when the symposium will deal with the

On Finday aftermoon the Committee on Fractures will present a program that previous experience leads us to believe will be of paramount interest to a large proportion of the Fellows attending the Congress—Leaders in this branch of surgical prictice will present methods concerning which all who deal at times with fractures will wish to be familiar.

diagnosis and treatment of fractures

The subjects of industrial medicine and trair matic surgery cancer and fractures will also be extensively featured in the extensive scientific exhibits at headquarters and in clinics and demon strations in the Chicago hospitals.

HOSPITAL CONFERENCE

The twentieth annual ho pital standardization conference of the College will be held during the first four days of the Chincal Congress An inter

esting program is being prepared consisting of formal addresses, papers, panel discussions and demonstrations. Throughout this program a special effort will be made to cover fully the many pertinent problems related to hospital administration. In brief, the four-day program will be arranged as follows.

Monday—At the opening session of the Congress, beginning at 10 a m, the approved list of hospitals will be officially announced and representatives of various national organizations will discuss various phases of hospital standardization. The afternoon session will be given over to a well arranged panel discussion on medical staff conferences, concluding with a staged demonstration of a model conference.

Tuesday—At the morning session the various special services of the general hospital will be discussed, including dental service, care of psychiatric patients, occupational therapy, physical therapy, cancer elimics, etc. For the afternoon a series of carefully selected and planned practical demonstrations in Chicago hospitals will be arranged, presenting such problems or phases of hospital work as are of greatest interest to the visiting delegates. A special session will be arranged for the evening for the discussion of the public relations problem of hospitals.

Wednesday—In the morning there will be a joint session with the Association of Medical Record Librarians of America for the discussion of medical record problems. In the afternoon visiting delegates will have an opportunity of attending demonstrations in hospital administration in local hospitals or of attending the special conference on graduate training for surgery at headquarters.

Thursday—The morning and afternoon sessions are to be given over to round table conferences for the discussion of sixteen pertinent practical topics of vital interest to all hospital administrators

ADVANCE REGISTRATION

The hospitals and medical schools of Chicago afford accommodations for a large number of visiting surgeons, but to insure agrunst overcrowding, attendance at the Congress will be limited to a number that can be comfortably accommodated at the chines, the limit of attendance being based upon the result of a survey of the amphitheaters, operating rooms, and laboratories of the hospitals and medical schools to determine their capacity for visitors. It is expected, therefore, that those surgeons who wish to attend the Congress will register in advance

A registration fee of \$5 00 is required of each surgeon attending the annual Clinical Congress, such fees providing the funds with which to meet the expenses of the meeting. To each surgeon registering in advance a formal receipt for the registration fee is issued, which receipt is to be exchanged for a general admission card upon his registration at headquarters. This card, which is non transferable, must be presented in order to secure clinic tickets and admission to the evening meetings.

Admittance to elinics and demonstrations will be controlled by means of special clinic tickets, such plan providing an efficient means for the distribution of the visiting surgeons among the several clinics and insuring against overcrowding, as the number of tickets issued for any clinic will be limited to the capacity of the room in which that clinic is given

PROGRAMS FOR EVENING MEETINGS

Presidential Meeting and Convocation-Mondon, 8 oo P. M -Ballroom Stevens Hotel

Address of Welcome Verson C DAVID VI D , Chicago, Chairman Committee on Arrangements Introduction of Foreign Guests

Address of the Returng President EVORVE H POOL, M.D., New York

Inauguration of Officers

Conferring of Fellowships Freneric A Bester, MD, Wanlegan Illinois

Conferring of Honorary Fellowships The President

Annual Oration on Surgery J P LOCKHART MUNNERY, WB BCh FRCS London

Tuesday, Il ednesday and Thursday 8 oo P M -Ballroom, Stevens Hotel

Nucleus Pulposus and Lower Back and Sciatic Pains HOWARD C NAFFEIGER M D San Francisco Symposium on Lymphedema

The Genesis and Consequences of Lymphedema Cecil K Darvaer M D, Boston Circulators and Lymphatic Disturbances in the Abdomen Millis D Gittin M D Indiguapolis Diverticula of the Intestine Claude F Dixon, M D Pochester, Minnesota Immediate or Delayed Treatment of Acute Choleostius (Liver Shock and Death) Henry W (Ave.

VD Yen lock

Tuberculosis of the Kidney FRANE HINMAN M D San Francisco

Physiological and Pathological Changes in the Univary Tract during Pregnancy J Masov Huvidles Ja

M D , Baltimore
Acute Pancreatitis IRVIN ABELL, M D , Louisville

Fracture Oration

Community Health Meeting-Friday 8 00 P 11 -Bullroom Stevens Hotel

Detailed program in preparation

PRELIMINARY CLINICAL PROGRAM

GENERAL SURGERY

Monday Afternoon

CHICAGO MEMORIAL HOSPITAL-Charles J Drucck, Sr , George L Brooks, Otta Saphir and George Landan Symposium Carcinoma of the rectum carcinoma of the colon

Charles E. Kalilke, George L. Brooks, Olto Saphir and George Landau Symposium Peptic ulcer

COOK COUNTY HOSPITAL-Sumner L Loch Surgery of the hand

PASSAVANT MEMORIAL HOSTITAL—Sumner L Koch Uschael L Mason and Hortey S Allen Surgery of the hand Dupuytren's contracture Von Volkmann's con tracture, nerve and tendon suture, burn contractures of the hand and plastic repair with skin grafts chronic tenosynovitis

ST ANTHONY DE PADUA HOSPITAL-R C Drury Spinal anesthesia NOMEN AND CHILDREN'S HOSPITAL-Clementine From

kousks and Helen M Kostka Varicose veins, treatment by injection and by ligation

Tuesday Morning

AUGUSTANA HOSPITAL-A M Percy Operations ALBERT MERRITT BILLINGS HOSPITAL-Clinical demon strations

Lester R Dragstedt and staff Chinical and experi mental studies in gastric and duodenal ulcer Walter L. Palmer, F. E. Templeton and Rudolf Schindler \ ray and gastroscopic studies of gastric

ulcer under medical treatment A Brunschung Pancreatoduodenectomy for carci

noma of the head of the pancreas H P Jenkins Abdominal wound disruptions and the durability of catgut sutures

CHICAGO MEMORIAL HOSPITAL-Charles E habike Stom ach surgery

Charles J Drueck, Sr Surgery of the colon and rectum COOK COUNTY HOSPITAL-Karl A Meyer, R II Jaffe, M J Hubeny, Aaron Arkin and Rudolf Schindler Sym

posium Surgery of the stomach Operations Dr Gateuood Children's aurgery George G Davis, Albert H Montgomery, John Harger,

Harry Jackson and John G Frost Operations GARFIELD PARK HOSPITAL-Edmund Foley, Paul Schmitt

Harold Wast Samuel Place, Claude Weldy and Fred DeStefano Symposium Gall bladder disease JACKSON PARK HOSPITAL-Staff Symposium Appendi

citis

Bamberger Surgical aspect R R Jamieson Medical aspect

J J Moore Pathological aspect G M Lucas Clinic

W Morley Sherin Gall bladder surgery

LUTHERAN DEACONESS HOSPITAL-John D Koucky, G H Mammen and George H Schroeder Operations MERCY HOSPITAL-Staff Dry clinic

C F Sawyer and associates Unusual causes of in testinal obstruction, partial and complete gastrec tomy

McGuire and associates Pelvic appendicitis, ob structive jaundice

PRESENTERIAN HOSPITAL-Kellogg Speed, Albert II Mort gomers, Dr. Gatewood and associates Operations I C David, C B Davis and E M Miller Dry clinics

and symposia RAVENSWOOD HOSPITAL-Dry clinic

P J Sarma Varicose veins, ligation and obliterative treatment

R E Dyer End results of gastro enterostomies, dem onstration of cases

D B Pond and R F Greening Treatment of osteo myelitis

J J Moore Tumors of breast D L Jenkinson \ ray interpretations

George de Tarnousty Lastrophy of bladder C J Gener Letopic wreter and absence of vaging.

cervical carcinomas If If Field Obstetric practice by general prac titioner

If F Gromenor Toxemia in pregnancy II C Hammond Indometriosis

MICHAEL REESE HOSPITAL-D C Straus Thyroid opera

Ralph B Beltman and II illiam Tannenbaum Gall bladder surgery

A A Strauss Gastro intestinal surgery James Palejdl Operations

P Shapiro Operations
Staff Symposium Gastro intestinal diseases A Stranss Surgical treatment of peptic ulcer

S Stranss Pre and postoperative care of the ulcer patient James Paterd! Perforating ulcer, surgical treatment

Jacob Meyer Medical care of the ulcer patient Staff Symposium Carcinoma of the rectum

A A Strauss Surgical S Strouss Surgical diathermy, after care and results of surgical diathermy

M Appel Histocytic variation in cancer tissue Gustav Kolisher History of Surgical diathermy Otto Saphir Pathology of the rectum following surgical diathermy

RESEARCH AND EDUCATIONAL HOSPITAL-Geza deTakats Lumbar sympathectomy operation

Staff Symposium Neurocirculatory diseases R Brunner The use of neosynephrine in spinal anesthesia

Paul W Smith Mechanisms governing peripheral

circulation Welliam C Beck Selection of cases for sympathectomy, demonstration of sympathectomized pa

tunts, evaluation of results, management of lymphedema F A Hick Vascular accidents associated with coro-

nary occlusion II C Lucih Unusual reactions following the use of mtroglycerme

Geza del akais Treatment of acute arternal occlusion. operability of hypertension, demonstration of cases Eurice Roth Observations on and results of suction and pressure (pavaet therapy)

P J Sorma and H L Mishkin The treatment of varicose veins and ulcers

J T Reynolds Imputations in peripheral vascular

ST ANTHONY DE PADLA HOSPITAL-Joseph Zabokrisky Operations.

Washington Boulevard Hospital—tribur R. Met General surgery and fractures

Wesley Memorial Hospital-R II Melegly Emory
Strauger and F L Bussey Gastrie surgers

Tuesday Afternoon

CITICAGO NEMORIAL HOSPITAL-Bennett R Parker Thy rold surgery

COOK COUNT HOSPITAL—Eduard J Least Operations
JACKSON PARK HOSPITAL—Harry E L Timm Operations
MERCH HOSPITAL—C L Marin Syroposium Rectal
neoulasins and inflammations

J & Aellev The hernia problem

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PASSALANT MEMORIAL HOSPITAL - J R Buchbinder 4 C Irv and 4rthur Bikeld Symposium on the bihary tract

MICHAEL REESE HOSPITAL-Dry clinic

Author Crohn The use and abuse of the injection
treatment of hemia suitable and un untable cases

methods
Leo Zimmerman Surgical treatment of direct inguinal

herma
Rudolf Schindler The use of the gastroscope and its

value to the surgeon

Samuel Goldberg Pooled human convalescent serum

treatment of surgical streptococcus hemolyticus

Infections

James Palejdl Congenital duodenal obstruction in
newborn duodenal diverticuli causing clinical symp-

Staff Dry clime

Leo Zimmerman Diseases of vens
Philip Shapiro Recent advances in the treatment of

vances vens
Bernard Poris
Bernard Poris
Samuel Prios
Surpical measures used in the treat
ment of peripheral circulatory di turbances dif
ferentiation between arterial and arteriolar pa in
ity as an aid in the selection of cases for sympathetic

ganglionectomy

St. Like's Hospital—Grea deTakats. George Sompham
George K. Fenn. Carl Johnson and Richard Capps. Sur
gery of cardiovascular diseases.

WOMEN AND CHILDREN'S HOSPITAL—Dry clinic Manage ment of diseases complicating surgery Carolyn MacDanald Syphilis

Rose Menendian Endocrine disorders
Ruth Renter Darrow Diabetes

H ednesday Morning

ALGUSTANA HOSPITAL—4 T Lundgren Earl Garside R
J E Oden and J W Vu um Operations
CHICAGO MEMORIAL HOSPITAL—Peter 3 Clark Lance

Rat. son George Landau and Otto Saghir Gall bladder symposium. Leo M Zimmerman and Richard E Heller Fundamental

Leo M Zimmerman and Richard E Heller Fundamental problems in the urgical treatment of inguinal herma modern management of varicose veios

CHILDRE'S MEMORIAL HOSPITAL— I H Montgomer, J. Ireland, J. Graham II Poits 1 Diggs and J. Mussil Operations and demonstration of cases

COLUMBUS HOSPITAL—D 4 Onth and E. Vora Bone and joint tuberculo is peritoritis Rollier treatment.

COOK COUNTY HOSPITAL—Raymord II McVedy Monad

Luchtenstein Frederick Tie Richard II Ja e and M. J.
Hubert, Symposium Diseases of the gall bladder
Raymond W. McNeil, Natur Schriger Geor L.
Apfelbach Roger I Naughan and Marshali Darum

Affidisch Roser T Voughan and Marshall Dans Operations

Evan roy Hospital -- Symposium Colon surgery

L. D. Snorf Diagnosis

E R Crowder Roentgenology E L Bergamin Pathology Federak Christopher Surgery

B R Parker Prognosis in malignancy Staff Dry climic

Marcus Hobari Operative treatment of low back pain James Greer Common bile duet obstructions II A Jennings Prevention of recurrence in femoral

hernia operations

Jackson Park Hospital—Arrie Bamberger Pre and

postoperative treatment of ungical cases
(C Clark and B Boil C x Operations,
LUTHERAN DEACONESS HOSPITAL-George O Solem Stat

gical indications in public u'est Mevicirel Terrections Savirere u-Clement L. Mar

In Anorecial tuberculous

Max Thorek Surgers in tuberculous patient.

I RESULTERIAN HOSPITAL—) C David Kell of Speed C B Davis Dr Gu cavid E M Miller & H Montgomery and associates Operations Migrate Peran Hospital—M L Parket Leo Zinwer

McBAEL PEELE HOSPITAL—M L Parker Leo Zimmer man and hamuel Goldberg Operations B Porti. Thyroid surgery

Samuel Perlot. Peripherovascular urvers
4 4 Strauss S Straus, and J Palejdl Gastro-in

testinal surgers

Rolph B Bettmon and II illiam Turnenbaum Gall
bladder operations

Staff Dr. clima Surgers of the gall bladder Samuel Sostin The preparation of the liver for ur

R I trens The technique of cholecystography
1 M Seebs S Parssand G Li Henslein The evaluation

tion of liver function test gall bladder diet arrest of pestoperative results of the gall bladder group.

Alph B bettiman Le Zieneren in und II i lism Len nendrum. Motion picture und diagrammatic dem on trations. The technique of cholecytectoms.

choledocostomy chaledochoss trostomy or enter ostomy

RESEARCH AND FOR CATION AL HOSPITAL-II II Cole Thy

rendectors operation for pylon, obstruction

Staff Dry clinic Symposium Diseases of the thyroid.

B. H. Cele Pre-operative and po toperative complications.

L Seed and R Brunner Blood pres ure tudies during

thyroidectom

J. M. Mora. Hepatic damage in hyperthyroidi.m

R. W. Krein. Cardiac complications of hyperthy

roids m

If H Cole Trachest collapse

John Howe The thyroid gland as observed at autop v
in patients with diseases other than hyperthyroid

J R But en Bacterological studies in the operating room

P J Sarma and H L Mushkin Clini on varico-e

ST ANTHONY DE PADUA HOSPITAL-S E Doulon and II P Sall tur Operations and demonstration of cases

ST LUKE'S HOSPITAL-II E Jones, Will Lyon, William R Cubbins and associates Operations

II S MARINE HOSPITAL-O E Nadean Results in hernia E C Lutton and R W Flynn Spinal anesthesia demon

stration

WESLEY MEMORIAL HOSPITAL-William Willer Review of gall bladder surgery

FRANCES E WILLARD HOSIITAL-I setor L Schrager

WOMEN AND CHILDREN'S HOSPITAL-Pearl If Steller 16dominal surgery

Hedresday Ifternoon

COLUMBUS HOSPITAL-D A Orth J L Spruck C J Scheribel and E D Aora Experimental thyrotoxicosis MICHAEL REESE HOSPITAL-Staff Symposium

Samuel Perlos, Paravertebral alcohol injections for

the rebef of cardiac pain

Leo Zimmerman and Otto Saphir Benign tumors of the thyroid gland

Samuel Goldberg Acute mesentene lymphadenitis strangulated hernias in premature infants

Thomas J Merar Rectal complications of lympho granuloma inguinale

Casper Epstein Fractures of the jans

M L Parker Carcinoma of the large bowel ST LUKE'S HOSPITAL-S II Me Irthur and associates Bile tract and colon surgery

WESLEY VEMORIAL HOSPITAL-Guy S I an ilstyne Ab dominal surgers

FRANCES E WILLARD HOSPITAL-LOUIS F Plat Clinic

Thursday Morning

AUGUSTANA HOSPITAL- \ M Percy Operations

CMICAGO MEMORIAL HOSPITAL-Peter S Clark Leo M Zimmerman and W L II einstein Gall bladder surgers COOK COUNTY HOSPITAL- Richard H Jaffe Pathological

conference Karl A Meyer, George G Davis tlbert H Montgomery and Max Thorek Operations

JACKSON PARK HOSPITAL-George W Lucas Operations LUTHERAN DE ACONESS HOSPITAL-John D Koucks, G H Mammen and George II Schroeder Operations

MERCY HOSPITAL-L D Moorhead Symposium Gotter PASSIVANT MEMORIAL HOSPITAL-Paul Starr Sympo-

sium Diseases of the endocrine glands PRESBYTERIAN HOSPITAL—I C David C B Davis William Miller and associates Operations

Kellog Speed, Dr Gatewood and 1 H Montgomery Dry clinics and symposia

MICHAEL REESE HOSPITAL-1 1 Strauss and 5 Strauss Gastro-intestinal surgery

D C Straus General surgery

Staff Thyroid symposium

D C Straus Group study and demonstration of thyroid records surgical management of hyper thy roidism

5 Soskin The endocrine disturbance in thyroid discase

L \ Aat Disturbed physiology of the cardiovascu lar system in thyroid disease

W Le Some clinical aspects of the heart in hyper thyroidism, medical management of hyperthymathiar

A S Bohning and L \ Kats The electrocardiogram in thiroid disease

Il' Il Hamburger Arrhythmias in thyroid disease B Portis Outpatient clinic management of hyperthyroidism

B Portes and H Roth Treatment of hyperthyroidism

complicated by pregnancy and syphilis R Levine Experimental treatment of hyperthyroid-

RESEARCH AND EDUCATIONAL HOSPITAL-C B Puestou Operations Choledochostomy, careinoma of rectum

C B Puestor. The effect of cholecystectomy on pressure in the choledochus, gall bladder fistulæ

Edmund Foley Differential diagnosis between intra

hepatic and extrahepatic jaundice

Il Il Cole The role of cystic duct obstruction to gall bladder discase A Harlung The advantage of combining gastro in

testinal series with cholecystography

ST ANTHONY DE PADUA HOSPITAL-F B Olentine Opera tions and demonstration of goiter and abdominal surgery cases Wisley Memorial Hospital-R II Mc Vegly and asso

ciates Surgery of jaundiced patients

FRANCES E WILLARD HOSPITAL-A E Stewart Clinic WOMEN AND CHILDREN'S HOSPITAL-Pearl M. Steller and

Marie Orlmayer Gastro intestinal clinic, gastroscopic technique

Alice Conklin Thyroidectomy Esther Rahn Repair of ventral hernia

Thursday Afternoon

CHICAGO MEMORIAL HOSPITAL-Bennett R Parker Leo M Zimmerman, Il alter S Priest, Ollo Saphir and George M Landan Sympo ium Thyroid disease

Frank II right Albert Zrunck, Leo M Zimmerman, M L Il einstein and Otto Saphir Symposium Blood transfusion

COOK (OUNTY HOSPITAL-Ralph B Beltman and Eduard J Leas Operations

MICHAEL REESE HO PITAL-Symposium testinal surgery

Leon Block The medical treatment of ulcerative colitis

A 1 Strawss The surgical management of ulcerative colitis

S Strates The use of ileostomy in ulcerative colitis and carcinoma of the colon

Otto Saplar Pathology of ulcerative colitis Discus-510n

R Irens \ ray diagnosis of ulcerative colitis and peptic ulcer Discussion A 1 Stranss and H F Binswanger Medical and

surgical treatment of terminal ileitis

RESEARCH AND EDUCATIONAL HOSTITAL-Symposium Diseases of the gastro intestinal tract

George Willes and W H Cole Pathology of carcinoma

of stomach total gastrectomy C L Birch Anemia associated with total gastrectomy M H Streicher Diagno..is of carcinoma of the rectum C B Puestor. Surgical treatment of carcinoma of the

rectum Bernard Portis Surgical treatment of complicated duodenal pleers

F L McMillan Regional ileitis

J. L. Spi ack Tubovalvular stoma with particular reference to gastrostomy

H. O. Wernicke. The injection treatment of hernix

ST ANTHONY DE PADLA HOSPITAL-II II Bradley Opera-

Wester Memjrial Hospital—E B Perry and H E E Barnard Abdominal surgery

Frances E. Willard Hospital—Olis M. Maller Clinic Women and Children's Hospital—Emilia Girjolus Cholecy-tectomy

Friday Morning

ALBIRT MERRITT BILLINGS HOSPITAL-Presentation on

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surgery and the circulation

If Learngtone Anesthesia and the circulation

None, H. B. thon H. \ Harkins and D. B.

Phenister Studies in causes and treatment of surgeral theck.

gical shock

If L, 4dams Intrathoracic operation and the circu-

COLLMBL HOSPITAL-II J Seifert Gastro intestinal surgery

COOL COUNTY HOSPITAL-Dr Gater and Children's sur

Rulph C Sulli au Ternon C David Harry Jackson and Frank J Jirka Operations
LACKSON PARA HOSPITAL-Trie Bamberger II Nost Cox

and C Clark Operations

LUTHERAN DEALONESS HOSPITAL-John D Koucks G II

Mammen and George H Schroeder Operations
George O Solem Surgical indications in peptic ulcer

PASSANANT MEMORIAL HOSPITAL—Samuel J Fogelson Laperimental surgical problems PRESAYTERIAN HOSPITAL—1 C Dirad Kelloge Speed C B Datis Dr Galegood William Miler and A H

Micrigomery Operations
MICREE REES HOSPITAL—J Pateful P Shapiro R
Lrauford B Porits S Goldberg M L Parker and Leo
Zimmerman Operations

Research and Education at Hospital—R. B. Malcolm Operative chine Neck dissection carefroma of breast surgical pathology of breast tumors

Stiff Dey clinic

T J Wachowski \ \ ray treatment of carcinoma of the breast.

Arrie Bamberger Ewing tumor with case report.

S. R. Rosenthal The town and autitoxin of burns
C. H. Puestow Vitamin continents in the healing of

burns
B H Cole Acute pancrentitis
Sr Anthony de Padua Hospital—J J Sprafa Abdom

inal urgery and demonstration of cases

Sr Elizabeth's Hospital—E D Kal dage Thyroid disease

Sr Like's Hospital—E II Hirsch E Jenkinson and staff members. Staff chine.

Wester Memorial Hospitus—Earl Latimer Unusual breast tumors

Friday Afternoon

Cook County Hospital—J G Frod Operations

Summer L Koch Surgery of the hand
E H Wars eask: Operations
Jackso Park Hospital-Horry E L Timm Operations

St Elizabeth's Hospital—J K Varal Pre and post operative intravenous administration of fat emulsion

Days to be Announced

COOR COUNTY HOSPITAL -- I schor L Schrager Symposium Appendicitis

Summer I. Kock Symposium Hand infections
Harry Jockson Symposium Skull fractures
Edain H. Miller Symposium Children a surgery
Fredrick G. Dyas Symposium Peritonius
Marthall Davison Symposium Diseases of the thy

roid gland

Fernon C Dand Symposium Surgery of the large
bowel

HENROTE HOSPITAL-John 1 Graham Demonstration chaic

Act 1 Meyer and Peter Ross Dry chaic

ORTHOPEDIC SURGERY

Monday Afternoon

RESEARCH AND LOCATIONAL HOSPITAL—H B Thomas F B Hark and C > Lamber! Symposium Tenodess Operations and demonstration of cases shelving of congenital dislocated hip demonstration of patients with closed reduction open reduction and shelving of congenital dislocation.

Tuesday Morning

CHILDREN'S MEMORIAL HOSPITAL—F Chandler F Seidler
C Pease and J Vorcross Operations and demonstra
tion of cases

COOR COUNT HOSPITAL—Inhar Coulcy Operations and symposium with demonstration of cases bland paging of high for fracture of neck of femur using Airschner were and Smith letteren nail, problems in diagnost of bone tumos, panful back in methodegal cases pensistent dizzness following head unjuries fractures in and about the ankle

Marcur H Hobari Operations removal of internal semi linear cartilage Demonstration of cases recurrent dislocations of the shoulder, internal derangement of the later joint spinal fusions and low back pain acquired dislocations of the hip following scarlet fever, syndactylism

PRESSYTERIAN HOSPITAL—E J Berkheiser Dry clinic and demonstration of cases

und demonstration of cases
MICHAEL REESE HOSPITAL—Philip Leain Daniel Levinthal
Charles Pease F Glassman Sidney Sideman Jerome G
Finder and I Wolin Operations

Tuesday 1sternoon

Wesley Menousk Hospital-F M Janey H Kelikian and O H Harrall Bone and joint surgery

II ednesday Mornine

LUTHERAN DEACONESS HOSPITAL—Emil 1 rink Indications for surgical treatment of arthritis

MUNICIPAL TUBERCLUSIS SANITARIUM—E. J. Birk

heiser Bone tuberculosis

VETERANS ADMINISTRATION FACILITY—S K Livingsion
Operations

Wester Memorial Hospital-Philip II Kreuscher and associates Bone and joint surgery knee injuries

Wednesday Afternoon

EVANSTON HOSPITAL-J L Porter and R C Lonergan Low back disorders MERCY HOSPITAL-J D Claridge and associates Prob

lems in orthopedic and traumatic surgery PRESENTERIAN HOSPITAL-E J Berkheiser, Kellogy Speed

and D Rider Operations

MICHAEL REESE HOSPITAL-Philip Learn Fracture problems, new approach for arthrodesis of knee paint, discussion of bone tumors, motion picture demonstration of manipulative surgery

Sidrey Sideman Rice bodies in tendon heath of the hard. Hoke stabilization of the foot, spastic paraly sis, roentgenologic library of the hip joint, fusion operation in tuberculosis of the knee joint, bunion

operation, riult ple cartilaginous exostosis
Daniel H. Levrikal and Irving If olin. Tendon transplantation in poliomyelitis, spastic paralysis recur rent di-location of shoulder flat feet demonstration of arthroplasties of the kree, hip and ellers kner joint surgery

Charles Peace Acute tran erre atrophy of Lore traumatic rup are of intervertebral due reduction of compression fracture of spine, ostenchondr >

matosis of the elbows

Jerome G Finder Chondromyxosarcoma two cales ferorplaity of the thumb for paralytic opportens pollicis osterchordroma of the tiba. Mcbride bunou plasty unusual bone turnor 1) of femur Key operation for soft come spastic paralysis bilateral adductor tenctory and obturator nerve repretory, care with unusual deformaties Frank George Fracture and dislocation of shoulder

supercredylar fracture or the humans fracture of the neck or tre ferrur, complete fracts, e of the tilia and abula removal of the bead of the radius farer cases reterms of the femore demonstration of various types of fractures and treatment

SE ACTEONEDE PADRI HOSPITAL-Thomas David New bree turpsy trepame pashrivental preimera

VINITARY COMMENTARY FACILITY-S F Lit ristor Erte tomers.

Thurday Morring

August Museum Branco Hospital-Presentation on

bree and her series

E. L. Compere. Leg lengtam and exercision technical and results spinal tusion in the correction of

C.E. Edwar. The patrology and treatment of to bromb us arter us studies in the mile of saletal gravitare er almare of Emb lereth.

H N Harkins Bone graft operations for ununited fracture P C Bury and R b Clouard Spinal extender il cyst

and its relation to kyphosis domains juvernils

C B Huggers Studies in the distribution of red hone marrow and the reticulocadothelial system in the skeleton

COOK COL TY HOSPITAL-Daniel II Lexinthal Pone graft surgery for nonumon, stabilization and benlyn bone tumors. Motion picture demonstration, Surplial treatment of apastic paralysis, surply if treatment of

residual paralysis follor ing poliomyelitis

Philip II Kreuscher Sicola operation, semilimar cartilage derangement, spanal gralts, new operation

for hip fusion, new operation for knet fusion Philip Icain Funnel skin grilt over os calcis spond, foliathesis, stabilization of paralytic varies foot, arthrodesis of ankle joint, hallox varus, to terculous spane, fusion, infantile paralysis, low back pain with "scrattera"

Frant G Murphy Skin grafts for old wounds of ley, unusual tone tumors, fracture into ankle joint, malunion of Colles' fracture, tuberculosis of currel form bone, sear contracture of forestin, skin graft

MICHAEL Press Hormitate-Philip Levin, Daniel Levin that Charles Peace, I Gla sman, I Wilin, Sidne, Side man and Jerome G I inder Operations

VETERA A ADMINISTRATION FACILITY-S F Stringston Maggot treatment of osteomyelitis

Thursday Asternoon

Cook Courte Herritat—I J Perkhel er Operations and demonstration of cases—springplointfens, anterior pelioriyelitis arthrodesis and tenden tranglantation PRESERVER RIAMINI - F J Porkhos or and D Pulor

Operations

RESPARCE AND FOR CATTO TAL HOSPITAL-II B Thomas. P. W. Hirkard C. V. Lambert Operation Selving of a consental dislocated E.p. Demonstration of patients with closed refuction, even reduction, and shelve or of erramital delocation

St Leke's Hospital-I is Pyrom and a weight Detengenter et ca er

Friday Morring

Large Descriped Horatal-Faul Velor Indiatarra for surmal treatment of arthrops

PRESETTER AN H PPTEL-E. I Berbher er, Fallage Sport and D Reder Ocerawire

FRACTURES AND TRAUMATIC SURGERY

Mand . 1 Sterreor

COTE COURTE El SPILL-William P. Calif n. and a.s. cates. Ocerative fractures.

Judica Para H. spirit.—S. F. II. Rev. state. C. W. Homen and II. I. M.L. Trimmatic surgery

STATESON'S DE PADRA EL CORAL-F W State Fractions sected chases of transmatic surpery

Tuesday Marrers

CERTAIN MEMBER Economic-Arter E Conley and S Pary Rurr Symposium Bland proming of fine turns of the emir

Fred Miner, T C Brown Emile Dunal and Gomes M. Land . Fracturef brth bereatt lewerler.

Core Cocver Herrar - William P Cult no and assercates Wardwark

Waserson's Bortzvill Hospital-Arker R. Met. General survey and Instance.

Tuesday Aformon

CHICAGO MENCREL HOSTILE-C R. G Fort for Hirte S nam and d H Malon. Symposium. Fractures; DELTE PEDALE ..

Cork Corver Hast tal - Summer L. Kork and associate. Tenden and nerve seturing of the hand, hand in entering

ENANSTON HOSPITAL—J I Farrell Undescended testicles
St ELIZABETH'S HOSPITAL—T G McDougall Carcinoma
of the bladder

Thursday Morning

CHILDREN'S MEMORIAL HOSPITAL—Herman L Kretschmer and K Burber Operations and demonstration of cases

COOK COUNTY HOSPITAL—Harry Culter and Charles
McKenna Symposium Chronic bladder neck obstructions in the male

JACKSON PARK HOSPITAL—II illiam I onker Transurethral prostatic resection compared to other types of prostatic supports

PRESBYTERIAN HOSPITAL—Herman L Kretschmer, Robert Herbst and associates Operations

MICHAEL REESE HOSPITAL—I Koll, J Eisenstaedt II Rolnick J Shapiro, J Grove, F Lieberthal and A L Jones Operations ST LLET'S HOSPITAL-L II Schmidt and associates Dry

VETERALS ADMINISTRATION FACILITY—T G McDougall Carcinoma of the bladder

WESLEY MEMORIAL HOSPITAL-V D Lespinasse and associates Clime

Friday Morning

PRISBATERIAN HOSPITAL—Herman L Kretschmer, Robert Herbst and associates Dry clinic

VETERANS ADMINISTRATION FACILITY—T G McDougall Penneal prostatectomy

Days to be Announced

COOK COUNTY HOSPITAL-L L 1 essen and Harry Rolnick Symposium Pyogenic infections of the upper unnary tract

HENROTIN HOSPITAL-Dorrin Kudnick Kidney complications in women

NEUROSURGERY

Monday Afternoon

COOK COUNTY HOSPITAL—H C I oris and J J Kearns Intracranal injury—demonstration of pathology physiology, management, surgical interference, sequelae complications

Tuesday Morning

RESEARCH AND FDUCATIONAL HOSPITAL—Geta deTakats
Operation Lumbar sympathectomy

Staff Symposium Neurocirculatory diseases

R Brunner The use of neosymephrine in spinal

anesthesia

Paul II Smith Mechanisms governing peripheral

circulation

Il illiam C Bect Selection of cases for sympathec

tomy, demonstration of sympathectomized patients evaluation of results the management of lymphe dema

F A Hick Vascular accidents associated with coronary occlusion

H C Luth Unusual reactions following the use of introdycerine

Gesa de Takats The treatment of acute arternal occlusion operability of bypertension, demonstration of cases

Enuice Roth Observations on and results of suction and pressure (payaet) therapy

H L Mishkin and P J Sarma The treatment of varicose veins and ulcers

J T Reynolds Amputations in peripheral vascular disease

Tuesday 1fternoon

MERCY HOSPITAL—C F Schaub and H C Vorts Neuro ophthalmology Presentation of cases with funds, permetter field findings, discussion of diagnostic groblems presentation and discussion of cases of recurrent papilledema following cranial explorations and decompressions

PRESBYTERIAN HOSPITAL-4 Verbrugghen Dry chinic and demonstration

Wednesday Morning

RESEARCH AND EDUCATIONAL HOSPITAL—Eric Oldberg Operations and demonstration of cases

II ednesday Afternoon

Coor COUNTY HOSPITAL—1 Verbrugghen Surgical para plegia—etiology pathology, classification, physiology, treatment prognosis

PRESBYTERIAN HOSPITAL-A Verbrugghen Operations

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL—P C Bucy and R B Cloward Spinal extradural cyst and its relation to Lyphosis dorsalis juvenilis

RESEARCH AND EDUCATIONAL HOSPITAL—Eric Oldberg Operations and demonstration of cases

Thursday Afternoon

Mercy Hospital—II C Vois and associates Symposium Management of cerebral gliomas

H C Vorts and H E Landes Demonstration of choroid plexus resection in hydrocephalus, cytome

enc studies in neurological lesions

C F Schaub and II C Norts Neuro ophthalmology Presentation of cases with fundi, perimettre field findings, discussion of diagnostic problems, presentation and discussion of cases of recurrent papil ledems following cramal explorations and decompressions

Presbyterian Hospital—A Verbrugghen Operations
Michael Reese Hospital—Staff Symposium In
tracranial suppuration

Ray Grinker Neurological aspects of intracranial suppuration
A Verbrugghen Surgical aspects of brain abscess

7 1 40

Friday Afternoon

Passala T Memorial Hospital—Loyal Datis and John

Marin Neurological surgery Presentation emphasizing diagnosis and treatment

PRESBYTERIAN HOSPITAL-A Verbrugghen Operations

THORACIC SURGERY

Monday Afternoon

ST LUKE'S HOSPITAL-II illard Van Ha.el Demonstra tion clinic Paul H Holinger Surgery of bronchu.

Tuesday Morning

COLUMBUS HOSPITAL-R M Darison C I olini M Journdes D Orth and G Mueller Symposium in tuber culosis Thoracic surgery pneumothorax treatment including climatotherapy

COOK COUNTY HOSPITAL-John B O Donoshue and Robert Lee Treatment of empyema ward walk and presenta tion of cases

RESEARCH AND EDUCATIONAL HOSPITAL-Rullard Lan Ha.el Operations with demonstration of cases VETERANS ADMINISTRATION FACILITY-Jerome R Bend New type of thoracoplasty chest surgery

Tuesday Afternoon

COOK COUNTY HOSPITAL-Rulph B Bettman Operations PRESBYTERIAN HOSPITAL-John Dorsey Dry clinic and

demonstration RESEARCH AND EDUCATIONAL HOSPITAL-Ballard 1 an Ha.el and staff Symposium Bronchogenic carcinoma
S. Levinson Pathology

Adolph Hartung Roentgenological diagnosis Paul H Holinger Bronchogenic aspects

Hallard I an IIa el Surgical consideration demon stration of cases and specimens surgical treatment of mediastinal tumors

M Joannider Collapse therapy of pulmonary tuber culosis T J II achousks Roentgenological consideration of

mediastinal tumors Wednesday Morning

EVANSTON HOSPITAL-Jerome R Head Indications for lobectomy MUNICIPAL TUBESCULOSIS SANIFARIUM-Richard Davison

Thoracoplasty

II edresday Afternoon

MUNICIPAL TUBERCULOSIS SANITARIUM-M Journales I hrenic surgery intrapleural pneumolysis

PRESENTERIAN HOSPITAL-John Dorsey Operations

Thursday Morning

MUNICIPAL TUBERCULOSIS SANITARIUM-Richard Durison Thoracoplasty pneumolysis

Thursday Afternoon

COOK COUNTY HOSPITAL-Ralph B Beliman Operations PRESAVIERIAN HOSPITAL-John Dorsey Operations

MICHAEL REESE HOSPITAL-Rolth B Betiman and II ellium Tannenbaum Thoracic surgery

Friday Morning

MICHAEL REESE HOSPITAL-Rolph B Bettman and Il il liam Tannenbaum Thoracoplasty operation Max Biesenthal Surgery of pulmonary tuberculosis. Max Buserthal and Ralph B Bettman Technique of

various operations used for pulmonary tuberculosis Artificial pneumothorax pneumolysis, thoracopla to motion picture and diagrammatic demon trations. Raigh B Bettman Treatment of empyema injunes of

the chest presentation of cases motion picture and diagrammatic demonstrations WOMEN AND CHILDREN'S HOSPITAL-Helen Hayden Emelia Girvolas Marcaret Austin and Vera B Brunden burg Broncho-copy in relation to asthma and allied

pulmonary conditions lipsodol injection

Friday Afternoon

COOR COUNTY HOSPITAL—John B O Donothue Frederick
The Richard Jaffe M J Bubeny S B Rosenblum
and 4 J Heuby Symposium Pulmonary tubet rulo 15

John B O Donoghue Operations

PRESENTERIAN HOSPITAL-John Dorsey Operations.

GYNECOLOGY

Wonday Afternoon

COOK COUNTY HOSPITAL-Frederick II Falls Operations. NOMEN AND CHILDREN'S HOSPITAL-Innie E Blount Operations

Tuesday Morning

COOK COUNTY HOSPITAL-Carey Culbertson and A E Kanter Operations

PRESBYTERIAN HOSPITAL- \ S Heaney Carey Culbertson A E Kanter E D Allen and H Bossen Operations MICHAEL REESE HOSPITAL-J L. Baer J E Lackner II illiam Ruborits I F Stein and Ralph Reis Operations. ST LUKE S HOSPITAL-II O Jones and associates Chinic. Wester Memorial Hospital-Mark Goldstine and asso-

ciates Uterine bleeding NOMEN AND CHILDREN'S HOSPITAL-Mary Edul II silicams Removal of abdominal and pelvic tumors

Otillie Zelerny Electrocoagulation of the cervix uten.

Tuesday Afternoon

COOK COUNTY HOSPITAL-J P Greenhill Operations. WOMEN AND CHILDREN'S HOSPITAL-Elouse Parsons Vac anal hysterectomy vaginal sterilization ligation of tubes per vaginal route

Hednesday Morning

COOK COUNTY HOSPITAL-C II Burrett Operations. Passavant Memorial Hospital—George Gardner and Arthur H Curtis Gynecological pathology—demon tration and conference

PRESENTERIAN HOSPITAL- \ S Heaney Carev Culberison A E Kanter E. D Allen and H Boysen Demonstra tion of cases

MICHAEL REESE HOSPITAL-Dry clinic.

Joseph L. Baer Shifting trends in the treatment of prolapse of the uterus.

Julius E Lackner Recent investigations in the action of progesterone

William II Rubovits Postoperative vaginal anti-

Irving I Stein Tvaluation of the 'safe period'"
Ralph A Reis Mammography

Lester F Frankenthal, Jr Treatment of vulvovaginitis
Michael L Leventhal The Manchester operation for

the cure of cystocele and prolapse Henry Burbaum The role of spermotorin in tem

porary sterility A F Lash Early diagnosis of carcinoma of the

L J DeCosta The use of progesterone in the prevention of habitual abortion

Alfred J Kobak Maternal mortality in Chicago Herrar Strauss Routine palpation of the ureters during hysterectomy

Wednesday Afternoon

CHICAGO MEMORIAL HOSPITAL-Paul M Cliner Julia C Straum, Harry L. Meyers, Beatrice E. Tucker and Walter Wiborg Plastic repair

COOK COUNTY HOSPITAL-II T Carlisle Operations NOMEY AND CHILDREN'S HOSPITAL-Constance O'Britis Operations

Thursday Morning

CHICAGO MEMORIAL HOSPITAL-Paul M Ciner, Julia C Straun, Harry L Meyers Beatrice E Tucker and Walter Il storg Symposium The treatment of prolapse of the uterus, cystocele and rectocele at various ages

COOK COUNTY HOSPITAL-Egon !! Fischmann Opera

PRESBYTERIA HOSPITAL-A S Heanes, Carey Culbertson A E Kanter, E D Allen and H Boysen Operations ST ANTHONY DE PADUA HOSPITAL-II A Weisskopf

Operation, WASHINGTO : BOULEVARD HOSPITAL-Paul C Fox OD

erations and demonstration of cases WESLEY MEMORIAL HOSPITAL-Mark Goldstine and asso.

Thursday Afternoon

COOK COUNTY HOSPITAL-Frederick II Falls Operations

Friday Morning

COOK COUNTY HOSPITAL-A E Lanter and Carey Cul bertson Operations

PRESENTERIAN HOSPITAL-A S Heaney, Carey Culbertson. 1 E hanter, E D Allen and H Boysen Operations

MICHAEL REESE HOSPITAL-J I Baer J E Lackner, William Rubouts, I F Stein and Ralph Reis Opera

Triday Afternoon

COOK COUNTY HOSPITAL-Carey Culbertson Operations MERCY HOSPITAL-II E Senmitz and associates Sym posium on operative gy necology RESEARCH AND EDUCATIONAL HOSPITAL-Symposium

Gynecological plastic operations with special reference to the use of local anesthesia

uterus and tubes

Frederick II Falls Vacinal hysterectomy for procidentia under local anesthesia M J Summerville Anterior colporrhaphy and inter

position operation under local anesthesia William H Browne Sturmdorf Kelly incontinence operation and permeorthaphy under local anes

WOMEN AND CHILDREN'S HOSPITAL-Catherine True Ab-

dominal gynecological cases Doug Parsons Treatment of sterility, treatment of eroded cervix by cauters lipiodol visualization of

Days to be Announced

COOK COUNTY HOSPITAL-J P Green I'll, C II Barrett,
II T Carlisle, Egon II Fischmann, Frederick II Falls,
A E Kanter and Carev Culbertson Symposium on fibroids

HENROTIN HOSPITAL-Eduard L Cornell Operations and demonstration of cases

Channing II Barrell and Lee Stone Operations and demonstration of cases

OBSTETRICS

Monday Afternoon

CHICAGO I YING IN HOSPITAL-Fred L. Adam and staff Motion picture demonstration of cesarean section COOK COUNTY HOSPITAL-A P Lash Puerperal sepsis,

ward walk

ciates Vaginal plastics

Tuesday Morning

CHICAGO LYING IN HOSPITAL-Fred L Adam, William J Dickmann, M Eduard Davis, H C Hesselline and staff Cesarean section Motion picture demonstration of colpocleisis operation

COOK COUNTY HOSPITAL-D S Hillis Treatment of abortion, ward walk

FRANCES F WILLARD HOSPITAL-Ascher H Goldfine Clinic

Tuesday Afternoon

CHICAGO LYTAG IN HOSPITAL-II illiam J Dreckmann and staff Dry clinic Eclampsia Motion picture demon stration of forceps delivery

COOK COUNTY HOSPITAL-L Rudolph and J II Bloom field Symposium The toxemias of pregnancy

ST ELIZABETH'S HOSPITAL-J R Lauers Cesarean sec

TRANCES E WILLARD HOSPITAL-Ascher II Goldfine Clinic

Wednesday Morning

CHICAGO LYING IN HOSPITAL-Fred L Adair, William J Dieckmann, M Edward Davis H C Hesselline and staff Operations and demonstration of cases

COOK COUNTY HOSPITAL-J E Fitzgerald Heart disease in pregnancy, ward walk

JACKSON PARI HOSPITAL-Charles F Greene, Louis H Stern, W J Asxon Davis, Jr and Aorman Zolla Treat ment of contracted pelves by cesarean section, version and forceps

RESEARCH AND EDUCATIONAL HOSPITAL-Sympos um Frederick H Falls Eclamptogenic toxemia, low cervica cesarean section under local anesthesia

112 II H Browne Progestin in the treatment of abortion

G II Reack Modification of the Friedmann reaction WESLEY MELORIAL HO-PITAL-Charles B Reed Wallsom B Serbin and G C Pichardson Moving picture demen stration of low forceps, breech extraction with forceps on aftercoming head spontaneous breech-marual aid

WOMEN AND CHILDREN & HOSPITAL-Dry clinic. Fluence Hark Prenatal care with reference to the baby

Ruth R. Darroz. Treatment of acterus gravas. Bertla Van Hoosen Maternety mortably

II edi esday Afternoon

CHICAGO LYING IN HOSPITAL-H C Hesseltire and taff Nonconvulsive toyemia of pregnancy. Motion picture demon tration of birth injury

CHICAGO MEMORIAL HOSPITAL-James E. Fa gera d. W. 1311 F. Herrit. George \ Schiff and Harry Benaren. Cesarean section

COOK COUNTS HOSPITAL-D S Hales J H B semfe'd and 4 F Lask Symposium Cesarean section.

RESEARCH AND EDITATIONAL HOSPITAL—Frederik H.
Fulls and taff Operations. Symposium Gynecological

Frederick II Falls Vulva carcinoma demonstration of cases, vulvectoms under local anesthesia. R 4 Lifterdall bolid tumors of overy removal of

evarian cyst. H H Hill Early carcinoma of cervit.

Nomen and Children's Hostital—Dry climic
Bertha | an Hossen and Maude Had II cerei | Aperthesia in obstetrics. Beatra & E Tucker Parasacral anesthesia.

Tlursdan Morning CHICAGO LYDNG-IN HOSPITAL-Fred L. 4d or William J

Die bmann M Edward Daris H C Hesseltine and taff

Monday Afternoon

St Elizabeth & Hosettal-J Brams Radium treatment

of fractures. VETERANS ADMINISTRATION FACILITY-G R. ABabon. Regular tumor clinic

Tuesday Mornin g

LUTHERAN DEACONESS HOSPITAL-Isad we Palot Pathol ogy of malignant growths in relation to therapeutic undications ST ELIZABETH S HOSPITAL-M G Luken Sarcoma of the

tomach

VETERANS ADMINI TRATION FACILITY-1 E. II salsoms Deep x ray and radium therapy

Tuesday Afternoon

RAVENSWOOD HOSPITAL-C Burgell J J Moore II P Saunders and L E Schaefer Cancer clime, presentation of perimens lantern lides, ex-estillu trating melaromas of shoulder and jaw

II edresday Morning

ALBERT MERRITT BILLINGS HOSPITAL-Presentation on tumor surrery

4 Brunschung Experimental production of tumors and the efficacy of Coley's town in the treatment of Cesarean section. Motion pirture demonstration of blood transfu son.

CHICAGO MENORIAL HOSPITAL-James E. Fir and His sum F. Herr" George \ Schiff and Harry Bergen Indications and technique for cesarean section nerve block in obstetnes. Cook Corver Hospital-J E.Fr. on Id and L. Ruda, h

Symposium Ectopic premaner it, diagnosis and treat meni.

Thursday Afternoon

CHICAGO LYING-IN HOSPITUL-W Edward Down and staff Placenta pravia abruptio placenta. Motion picture demon, tration of postpartum hemorrhage COOK COUNT HOSPITAL-J H E worted and D S

He is Symposium Late hemorrhages of pregrancy

Friday Vorning

CHICAGO LYNG-IN HOSPITAL-Fred L. Adapt William J. Die beinen M. Edwird Doris H. C. Hesseline and etaff. Cesarran section Dry clinic.

COOK COUNTS HOMPITAL-4 F Lask, Toxerras, of preg nancy ward walk.

Wesler Memorial Hospital-Charles B Reed William B Sorve and G C Full-rises Ablatio placents pla Cents previa

NOMEN AND CHILDREN'S HOSPITAL-Bertha I on Hoosen and Maude Had Berrett Surpeal cases complicating obstetnes.

Friday Afterroom

CHICAGO LVING IN HOSPITAL-Fred L. Idoir and taff Dry clinic. Motion picture demonstration of epinolomy COOK COUNTY HOSPITAL-L. End with Symposium Prolonged labor con to tion one divisors.

TUMORS AND IRRADIATION

experimental sarcoma pall atme treatment of pulmonary meta-tases from mahmant tumors late results in treatment of benien mint-cell tumors of home

D B Flowester and associates. Studies in the etiology diagnosis and treatment of bone numors. Horaell Wason Extra heletal os free tamors.

VETERAL ADMINISTRATION FACILITY-MAI COMO AD mual tumor chine Presertation of capter cases, indica tions, technique and results of radium theraps G R. Allaien Diagnosis and treatment.

Tlursday Mernine

COLUMNS HOSPITAL-D & Orth M Barn n and H E. Drus Symnosaum Breaut cancer

LUTHER ON DEACONESS HOSPITAL-Isad we Pilot Pathel ogs of malignant growths in relation to therapents. indications

MERCA HOSPITAL-W J Pr kett Unusual cases of malignance

MICHAEL REESE HOSPITUL-Max Court and tall Results of radiation treatment of cancer of mouth, ton I, pharyrx and larvax presentation of cases. Radiation treatment of cancer of the brea. t presentation of cases. Motor pictures all, training the technique of radium treatment of cancer of the month and cancer of the cervis. Tran.ll.m.nation of the brea.

ST FLIZABFTH'S HOSPITAL-Leo M Zimmerman Mediastinal tumors

VETERANS ADMINISTRATION FACILITY—A E Halliams Inspection of deep x ray and radium therapy unit

Thursday Afternoon

PASSALANT MEMORIAL HOSPITAL—Mar Cutler The organ ization of a tumor clinic Personnel, equipment, records, follow up

Staff Carcinoma of the breast

John 1 Holfer Surgical considerations

James T Case Pre and postoperative x ray radiation

L M Rosenthal Radium treatment

Major Greene Bronchiogenic tumors of the neck John F Delph and Earl Barth Carcinoma of the

larynx, hypopharynx and tonsil John Mohardt A survey of some proposed cancer cures Friday Morning

MERCY HOSPITAL—Heury L. Schmidt and associates Symposium Radiologic therapy of malignancy

Sr Luke's Hospital—H E Mock and associates Tumor clinic

VETERANS ADMINISTRATION FACILITY—G R Allaben Regular tumor clinic

Friday Afternoon

PRESENTERIAN HOSPITAL—Carl Appelbach and F Squire
Dry clinic and demonstration

Day to be Announced

HENROTIN HOSPITAL—Samuel Levinson Surgical pathology

PLASTIC AND FACIOMAXILLARY SURGERY

Tuesday Morning

CHICAGO MEMORIAL HOSPITAL—Casper M Epstein Symposium Plastic, including faciomaxillary surgery

COOR COUNTY HOSPITAL—Joseph E Schaefer Demonstra tuon of cases showing corrected temporomandibular ankylosis, harelips and cleft polates, pedicle flap and full thickness graft cases, repair of burns traumatic in junes, plastic repairs of controlled carcinoma cases

Tuesday Afternoon

PRESBYTERIAN HOSPITAL—Frederick Moorehead and R Olmsled Operations

Wednesday Afternoon

PRESBYTERIAN HOSPITAL-Frederick Moorehead and R. Olmsted Operations

Thursday Morning

COOK COUNTY HOSPITAL.—Joseph F Schaefer Demon stration of cases showing carcinoma of mouth, lips and face, with colored photographs of lesions before and after radiation

MICHAEL PELSE HOSPITAL-Casper Epstein Oral surgery

Thursday Afternoon

PRESBYTERIAN HOSPITAL—Frederick Moorehead and R Olmsted Dry clinic and demonstration

Friday Afternoon

CHILDREN'S MEMORIAL HOSPITAL-L II Schultz Dry clinic and demonstration

PRESENTERIAN HOSPITAL-Frederick Moorehead and R. Olmsted Operations

ROENTGENOLOGY

Tuesday Morning

LUTHERAN DEACONESS HOSPITAL—Ralph II illy Newer concepts in the treatment of carcinoma

Tuesday Afternoon

ST ANTRONS DE PADUA HOSPITAL-L S Tichy Silicosis demonstration

St Luke's Hospital—Staff \ \ ray diagnosis

Wednesday Afternoon

Augustana Hospital—David S Beilen Roentgen ding nosis of Lastro intestinal lesions

ALBERT MERRITT BILLINGS HOSPITAL-Paul C Hodges and associates X ray diagnosis

Thursday Morning

LUTHERAN DEACONESS HOSPITAL—Ralph Willy Newer concepts in the treatment of carcinoma

RESEARCH A TO EDUCATIONAL HOSPITAL—Adolph Harlung Conference, on x ray diagnosis

Thursday Afternoon

COOL COUNTY HOSPITAL-Robert F McAattin High voltage therapy of malignancies

M J Hubeny Roentgenological examination of appendix

ST LUKE'S HOSPITAL-Staff \ ray diagnosis

Friday Afternoon

Augustana Hospital—David S Beilen Roentgen diag Bosis of lesions of urmary tract

COOK COUNTY HOSPITAL—J Paul Bennett Roentgeno logical examination of the kidneys, ureters and bladder

Robert F McNattin High voltage therapy of malig

Days to be Announced

HENROTIN HOSPITAL-Arthur R Hausen X ray demon stration

WESLEY MEMORIAL HOSPITAL—Frank L Hussey The interpretation of viray findings in obscure gastric and duodenti lesions, the use of x ray in conjunction with surgery of the large bowe!

Physical

PHYSICAL THERAPY

Monday Ifternoon

COOK COUNTY HOSPITAL-Distracts Ashab Discus ion of general physical therapy procedures

Tuesday Marning

COOK COUNTY HOSPITAL-Disraels Lobak therapy in posttraumatic conditions

Tuesday Afternoon

COOL COUNTY HOSPITAL-1 F Hummon Physical therapy in infantile paralysis

ll ednesday Morning

COOK COUNTY HOSPITAL-Distaels Robot Physical ther apy in postoperative and traumatic infections

II ednesday Afternoon

COOK COUNTY HOSPITAL-I F Hummon Physical ther apy in neurosurgical and neurological conditions

Thursday Morning

COOK COLNEY HOSPITAL-Disraels Kobak Physical ther apy in low back conditions

Thursday Ifternoon

COOK COUNTY HOSPITAL-I F Hummon Manipulative treatment in low back conditions

Friday Vorning

COOK COUNTY HOSPITAL-Disraels Appeal I by sical ther any in bursitis

Iriday Mernoon

COOL COLNEY HOSPITAL-I F Hummon Physical ther any in the prevention of deformities ST LUKE'S HOSPITAL-II F Mack and John S Coulter

OPHTHALMOLOGY

chase

Monday Isternoon

ALBERT MERRITT BILLINGS HOSPITAL-A C Arouse Fundus diagnosis CHILDREN'S MEMORIAL HOSPITAL-G Guider Orthoptics

COOL COUNTY HOSPITAL-L B Fouler Fundus diag nostic chaic

MERCY HOSPITAL-C F Schaub F I Bornell and I A Rolling Fundus climic

MICHAEL REESE HOSPITAL-Philip Helper Orthoptics RUSH MEDICAL COLLEGE-Or Rolmes Orthoptics

I nesday Morning

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL-George Gustor Orthoptic training classification of squint Sanford R Gifford Concomitant and paralytic squint RUSH MEDICAL COLLEGE-Dr Halber Histopathology

Tuesday Afternoon

ALBERT MERRITT BILLIAGS HOSPITAL-C | Dermey Orthoptics

COLLMBIS HOSPITAL-M Goldenburg Eye clime COOK COUNTY HOSPITAL-C F Lerger Medical ophthal

mology MERCY HOSPITAL-C F Schaub and H C Voris Neuro ophthalmology I resentation of cases with funds pen metric field findings discussion of diagnostic problems presentation and discussion of cases of recurrent papil ledema following cranial explorations and decompressions

MICHAEL REESE HOSPITAL-T M Shapira RUSH MEDICAL COLLEGE-Dr Jacobson Fundus chaic

ST LULE'S HOSPITAL~E 4 Vorisek Chinical cases

Il ednesday Morning

COOL COUNTY HOSPITAL-Sanford R Gifford Retinal de rachment RUSH MEDICAL COLLEGE-II F Moncreif Cataract

Il ednesday Afternoon

Reconstructive cases in physical therapy

ALBERT MERRITT BILLINGS HOSPITAL-S S Blankstein End results of retinal detachment operations

CIPLORENS MEMORIAL HOSPITAL-R C Gamble and E A Vorisek Diagnostic clime MERCY HOSPITAL-C F School F I Barnett and E A

Rolling I undus climic MICHAEL REESE HOSPITAL-S J Mever and D Snyducker Retanal detachment clinic

Sr Lake a Hospital-J II alsh Clinical cases U S MARINE HOSMIAL- lifted V Murray Eye injuries

Thursday Mernoon

ALBERT MERRITT BILLINGS HOSPITAL-L Bothman Macu for discase

COLUMBUS HOSPITAL- If Goldenburg Eye clinic COOK COUNTY HOSPITAL-E B Fowler Fundus clinic MERCY HOSPITAL-C F School and H C lores Neuro-

ophthalmology I resentation of cases with fundi pen metric field findings diagnostic problems presentation and discussion of cases of recurrent papilledema follow ing cranial explorations and decompressions

MICHAEL REESE HOSPITAL-Jock Conon Glaucoma

ST LLKE & HOSPITAL-Frank I Brauley and J W Clark Cimical cases

Friday Ifternoon ALBERT MERRITT BILLINGS HOSPITAL-Dr McSkellman

Cataract results CHILDREN'S MEMORIAL HOSPITAL-R O Riser Diagnostic

RESH MEDICAL COLLEGE-E Selinger Medical ophthal molegy

Sr Lung s Hospitul -- R C Gamble Clinical cases

Day to be Announced

HENROTTN HOSPITAL-George II Mahoney E A Roling and leans Barnett bye choic



John Hunter

SURGERY

GYNECOLOGY AND OBSTETRICS

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NUMBER 2

PREGNANCY COMPLICATING BONE TUMORS

LFON S McGOOGAN, AB, MD, Omaha, Nebraska

NTHE last few years 10 instances of bone tumors complicating pregnancy have been observed Literary research has revealed widely scattered references, and isolated case reports of this interesting subject, but there has been no comprehensive review of the entire problem in the last 50 years. As material was assembled it naturally divided itself into the following subheads (a) the effect of pregnancy upon neoplasms in general, (b) the effect of pregnancy upon bone metabolism, (c) the effect of pregnancy upon bone tumor, a review of the literature, presentation of cases, and discussion of each group

THE EFFECT OF PREGNANCY UPON TUMOR GROWTH

Emge has reviewed this problem. He observed the growth of neoplasms in the pregnant and non-pregnant animal comparing one with the other. He concluded that the growth of neoplastic tissue will be affected by a pregnancy only as that tissue is affected by the local and remote bodily changes incident to pregnancy, i.e. changes incident to increased blood vascular supply and hormonal stimuli, the ultimate result depending upon the duration of gestation, that pregnancy as a rule does not influence growth rate or size of neoplasms beyond certain reactions of which retardation is the most frequent, that in many

From the Department of Obstetrics and Cynecology Um versity of Nebraska College of Medicine

instances the growth rate remains unaffected and only on rare occasions is acceleration observed, and finally that at the termination of pregnancy the neoplastic tissue resumes its primary growth rate

It has not as yet been proved that pregnancy favors the inception of malignant dc-

generation of tumors

In his extensive review, Emge mentions many types of tumors, but he does not mention tumors of the bones It can be assumed. however, that his conclusions would be ap plicable to bone tumors The growth of neoplastie tissue, therefore, in or of the bones, primary or metastatic would be "affected by a pregnancy only as that tissue is affected by the local and remote changes incident to pregnaney" Included in this group of reactions would be (x) increased vascularity in the pelvis and breast, affecting tissues in these areas, (2) changed hormonal activities, hence bony tissue sensitive to hormonal stimuli would show growth changes, and (3) as the metabolism of bone is modified during gestation, tumors of the bone might show increased or deereased activity

THE FFFECT OF PREGNANCY UPON BONE METABOLISM

The whole subject of normal bone metabolism with its underlying physicochemical processes is not completely known. The deposition of the ealcum phosphate complex is

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dependent upon the amount of available cal cium and phosphorus in the blood serum and the presence of an enzyme phosphoric entase, in the bone (4)

The whole growth of bone, in addition, is under control of the endocrine system as has been demonstrated in the case of the gonads, pituitary, thyroid, and parathyroid glands (Cuthbertson)

Thomson and Collipgive an excellent review The blood serum calcium level is maintained in part by absorption from the alimentary tract, normal levels demanding a diet bal anced in respect to calcium, phosphorus, and vitamin D

Variations from the normal serum calcium level of 10 milligrams per 100 cubic centi meters of blood are frequent. Hypocalcemia is present in dietary and parathyroid deficiencies Hypercalcemia is present in hyper parathyroidism

The secretion of the parathyroid maintains the normal calcification of hone and the calcification of pathological areas in the healing processes (10) by a specific action. It raises the blood calcium level, the excess heim, ob tained from the skeleton

As to the exact chemical form in which the calcium phosphate complex is laid down and in which structure of the hone the storage is accomplished is still disputed Bauer, Auh, and Albright and Lambie and his coworkers have brought forth evidence that the trabec ulæ of the hones form a mobile store of calcium Bodansky and Jaffe, however, hehere that the bone most recently laid down in whatever site is the most readily dissolved

The calcium storage must surely be mobile in character, reduced on demand, and replen ished when circumstances are favorable. Hun ter and Aub demonstrated this with their work in lead poisoning

As a result of the catabolic hone metabolism, calcium is put back into the blood stream, but is it available for bone metabolism? McCrud den, and Bauer, Albright, and Aub believe that calcium once liberated from bones cannot be used again even while bone building is actively occurring Bauer, Albright, and Auh studied the calcium metabolism during preg nancy and arrived at the conclusion that on a

low calcium intake the patient excreted the same amount of calcium as she would have been expected to do had she not been pregnant, suggesting that the calcium excreted is not available for fetal use or for growth during the building of bones. It also suggests that the calcium ingested by the mother is avail able first to the fetus and that she may use any left over after fetal needs are supplied. The depletion therefore of the maternal bones arises not as a withdrawal of calcium for fetal use but from an insufficiency of available calcium to meet the normal requirements of anaholic metabolism

Thomson and Collip believe that there is a possibility of calcium being transferred from one part of the bone to another Hamilton has produced evidence to show that the fetus just before hirth accumulates a store of calcium which is used in hone growth just after birth

When pregnancy occurs, metabolism in all its phases is altered and, as a result, bone metabolism is also affected. There is a grad ual fall in the serum calcium during pregnanci from the normal of 10 16 milligrams in early pregnancy to o 4 milligrams in late pregnancy with many readings as low as 8 milligrams (5-8 14 25 17)

The normal hypocalcemia of pregnancy may be due to a variety of causes of which the greatest is no doubt due to the growth de mands of the fetus. The calcium demand average is o i gram per day over the entire gestational period (5) To meet this demand some investigators believe that a drain is placed particularly on the mobile store of calcium, depleting the maternal tissues and converting that calcium for fetal use. If the conclusions of McCrudden and of Bauer and Albright and Aub are correct that endogenous calcium is unavailable for fetal use we must fall back upon the theory that the mobile calcium is depleted but not for fetal use and it cannot be replaced unless there is a surplus of available calcium after fetal needs have been supplied. The maternal anabolic calcium metabolism cannot keep pace with the cata bolic process, when the available calcium supply is lowered as it is in pregnancy, and if during pregnancy dietary factors which lead to hypocalcemia are also operating then the

maternal serum calcium may tend to fall more rapidly. In other instances the hypocalcemia may be due to an altered function of the ductless glands, particularly the parathyroids, for pregnancy makes demands upon the parathyroids often unmasking a latent insufficiency (8)

On the other hand a pre-evisting hyperparathyroidsm, either latent or active, could be further activated by pregnancy and a hypercalcemia result. Again this calcium is not available for either fetus or mother and is evereted

In contrast to depletion of bone there is the possibility of the opposite reaction—i e increased storage. This may occur as the result of greater calcium intake or changed endocrine stimuli or both. Stander has reported small bony evostoses inside the skull developing during pregnancy.

Insummary, then, bone metabolism is altered by pregnancy Locally the bones are depleted of their calcium phosphate complex by normal and altered metabolic processes, the fetus using the available supply before the mother's needs can be supplied

Available calcium supply and hormonal activity may normally affect bone tumor grow the As these factors are altered during pregnancy, in this way will pregnancy indirectly affect bone tumor growth In addition the local factor of blood supply changes may also play a part. Hyperemia leads invariably to osteoprosis and partial reversion of the bone to a primitive non-specific connective tissue, and ischemia to an increase in calcification and sclerosis (16)

EXOSTOSES AND OSTEOCHONDROMA

These tumors with the groups called osteoma and chondroma form one large group of
tumors according to Geschickter and Copeland The classification has resulted from the
incomplete study of the tumors. If only a
small section of a tumor is removed for microscopic study and if the whole tumor is not
sectioned, the pathological diagnosis will vary
as the section contains cartilage, bone, or
both The literature subdivisions will be followed as much as possible for the sake of
clarity. A summary of the entire group will
then be made

Malignant changes These tumors may undergo malignant changes Geschickter states that in the single lesion the tumor may undergo malignant changes after the patient has reached 30 years of age In the multiple lesions malignant changes are frequent in the ribs, particularly when associated with lesions of the small bones

Exostoses Muller, and Tarmer and Budin both give excellent reviews of the literature The growths are situated anywhere on the pelvic bones but particularly at the attachment of the tendon There may be single or multiple pelvic tumors and the size and shape varies

The tumors grow slowly and in many instances the size of the tumor may be obstetrically insignificant for a number of years. They may become dangerous, first, because of encroachment upon the size of the pelvic canal, second, because of possible perforation of overlying soft parts including the uterus (24), and, third, because of necrosis of soft parts resulting from sustained pressure occasioned during labor (42). The fetus may also be injured as in the case reported by Schrank (48).

As to the effect of pregnancy upon these tumors there is little definite information, but one gains the opinion that pregnancy has little if any effect upon the tumor growth rate Marchant, Smith, and Schrank mention the slow growth of the tumors in their cases. One author thinks the tumors grow more rapidly (52)

Osteoma Careful studies of the cases called osteoma would undoubtedly show that these tumors were in reality osteochondroma. The tumors are larger than the evostoses and if not carefully sectioned their true character would be missed.

Cazeau and Tarnier in 1884 recognized only the cases of MacKibbon and Leydig Ten years later Winckel (50) listed 9 cases Since then West, Finzi, and Broadbent bave each reported a case The microscopic description of the tumor in West's case is typical of an osteochondroma

Osteochondroma and chondroma Schoppig in 1907 made an exhaustive review of the literature concerning pelvic osteochondroma



Fig. 1. Osteochondroma of the left shum

and chondroma. He discovered 47 cases which were associated with pregnancy, and reports a case of his own. Vuller mentions 7 cases not listed by Schoppig and additional cases have hen reported by Deville, Ferront and Lederer, bringing the total number to 38. Of the 38 cases 5 were considered as malignant those of Vailic (46 47). Bartscher: Jardine, Taufer, and Lederer. These will he considered under a separate title, chondromyxosarcoma separate title, chondromyxosarcoma.

A review of the original references was un dettalent to dissoor with at clinical effect if any the pregnancy bad upon the growth rate of the tumor. In the beinging groups this was recorded only five times. Some growth rates seemed to he increased (37–43), some not disturbed (18, 49, 49).

CASE REPORTS

CASE I Covenant Hospital No 3043.7 The patient aged 20 years white female was admitted on October 15 1035 complanming of a lump on the left side. Two years previou by the patient notized a small slowly growing lump near the anterior super our spine of the left ilum (Fig. 1) The mass on admission was the size of a goose egg. She became pregnant in October 1034 and was delivered by a cesarean section in July 1035 because of pelvie disproportion. She helies that the tumor did nut grow more rapidly during her pregnance. Other phases of the history are not essential

Stereoscopic anteroposterior roentgenograms of the pelvis show an irregular fobular and rounded tumor mass measuring ahout 6 by 9 centimeters arising from the crest and posterior a peet of the left hum and protruding forward over the pelvic hum. The upper femora show thickening and short-

ening of the femoral necks and the femoral heads are rotated forward and laterally. Small ero-to-es are present along the medial a-pects of the femoral necks and on the right pubs near the symphysis and on the left pubs in the mid part of the ascending ramus. Small exostoses are also present along the balance.

On October 16 1935 under gas anesthena the tumor was removed h Dr P W Tipton She made an uneventida recover and was dismissed on October 20 1933 Microscopic sections howed the tumor to be composed of cancellous bone alternating with fibrous tissue. There was no evidence of malignance.

Olagno is O teochondroma Case 2 Lutheran Ho-pital No 2580 Courtess Dr L Hausch The patient a white female are 28 years secundipara trigravida was admitted to Lutheran Ho pital March 2 1933 The patient's first pregnancy was normal and terminated after a 6 hour labor. The second pregnancy in 1931 was normal but during labor a pelvic examination re vealed a firm tumor about the size of a goose egg which was attached to the left half of the sacral area and seemed to be just under the vaginal mucosa The cervax was almost fully dilated but no descent of the head occurred because it was held up by the tumor described. In view of the fact that the tumor was accessible an incision of the vaginal mucosa was done and the tumor ea ily removed. The wound in the varina was closed the ane thesia discontinued and the child was delivered pontaneoully total duration of labor was q hours The tumor was an osteochondroma

The lat menses preceding the onset of the present pregnancy began June 10 1932. The gestation con timude normally. A polyne examination revealed a recurrence of the o-teochondroma recurring as nu merous small grape used tumors and encroaching somewhat upon the use of the pelyne canal. The patient was delivered of a normal female child by classical cestarean section. She had an uneventful convide-cente and the and her child were di massed from the hospital on March 70 1933. An examination was done 6 weeks later and the masses were many confidence of trouversity and the masses where the support of the present time there has been many advanced of trouversity.

TREATMENT

The obstetrical care and type of delivery would of course depend upon the location of the tumor and the amount of encroachment upon the pelvic canal by the tumor Some patients could be delivered through the vagina, others would require cesarean section. A few patients might be delivered by the vaginal route after removal of the tumor through the vagina as was done in the cases of Drew and Burns, and the case which has been reported above.

Abdominal removal of the tumor might be considered and indicated in some instances during gestation. The enlarged uterus would render a difficult operation more difficult and it would be wise to deliver that patient at term, attempting surgery of the bone tumor at a later date. If cesarean section were done a biops, should be performed to ascertain a definite diagnosis particularly if malignancy were suspected.

Extrapel.tc osteochondroma Osteochondroma may occur in bones other than those of the pelvic gridle and complicate pregnancy only by their presence Review of the literature has not revealed such an instance A case is reported below

CASE 3 Methodist Hospital No 107,709 The patient was a Joung white female age 20 years, who entered the hospital May 20 1934, complaining of a lump on the right shoulder blade The patient first noticed a small lump the size of a small valuat on the outer lower aspect of her right shoulder blade 7 years ago She was pregnant at the time There seemed to be, however, no increase in size or trouble caused by the tumor, until 18 months prior to admission, at which time it began growing rapidly (Fig 2) There were no intervening pregnances

On examination the general physical examination showed a mass about r.; centimeters in diameter fixed to the right scapula. There was no tenderness

or impairment of motion

An excision of the right scapula with the tumor mass was done by Dr Robert Schrock. Pathological examination showed the tumor to be an osteochon droma. Convalescence was uneventful. A follow up examination done July 17, 1934 revealed an excellent anatomical and functional result.

Inasmuch as the tumor made its original appearance during gestation the problem of the influence of the pregnancy upon its original growth must be considered. Did the pregnancy through its hormones activate an inclusion rest (34) into growth which was only slight, or was it purely a happenstance that the tumor appeared at this particular time? Another question is what caused the tumor to remain quiescent for 5½ years and then suddenly start to grow—was its growth activated by the same condition as that which caused its original appearance? If so, certainly the pregnancy played little or no part in the picture

Multiple osteochondroma Two cases of multiple osteochondroma complicated by a preg-



Fig 2 Osteochondroma of the left scapula

nancy have been reported Jacobson reported a case in 1921 and Blackaby in 1931. In the former instance there was a definite family history of this deformity. In a recent personal communication Jacobson (31) stated that the patient was delivered spontaneously by a midwife and that he had since lost track of the patient. In Blackaby's case, which was delivered by hysterotomy at term there again is no mention of the effect of pregnancy and the puerperium. Those tumors may undergo secondary malignant changes, becoming a chondromy vosarcoma and causing death.

CASE 4 Mrs N W M, nullipara primigravida, had her last period November 10 1033 In Febru arv, 1034, she noticed a small hard lump deep under the right breast. It was about the size of a walnut, hard and immobile. In May because the tumor increased in size she entered the University Hospital in Omaha. At that time the patient had lost con siderable weight, was suffering from a non productive cough and pain in the right axilla and arm.

Examination of the patient showed a moderate hymph adenopaths of the cervical glands. Under the right breast and extending upward and toward the avilla was a large mass 18 centimeters in diameter and about 10 centimeters in depth above the chest wall. The mass was large, regular in contour, nontender, unattached to superficial shin or breast tissue, but firmly attached to the chest wall Breath sounds were absent over the entire right chest except at the apex

In the abdomen the uterus was enlarged by a 7 months pregnancy

There was a firm hard enlargement of the prox mal end of the humerus and similar tessons were noted on the distal end of the proximal phalanx in the third digit of the right hand and in the distaf end of the right femur (Her father also had multuple exostess)

Roentgenographic study of the right hand shows a bony evostors. By 12 millimeters using from the distal end of the protunal phalanx of the middle finger. The chest shows a density overflying the right fourth to sixth ribs antenody in the region of the supericial mass. The origin of this tumor mass is probably from the fourth nib or adjacent tissues and has grown inward into the chest as well as out ward into the thoracic wall. The selection shows multiple exostosis of a bony consistency arising from the femoral nock and the humeral neck.

The patient was then dismissed to her physician who treated her with Coley's toxin lery little change was noted in the local or general condition

On August 17 1034 she was delivered of a 75 pound bab, girl by cesarean secton because of marked respiratory and cardiac embarrassment. She made an uneventful recovery from her delivery but her general condition became worse. The thoract tumor became necrotic and drained through the skin bhe died May 22 1031.

The patient presented a family history of skeletal abnormalities. Her bone lesions gave her no difficulty until during the third month of pregnancy when one of the rib lesions began to grow rapidly. Did pregnancy activate the tumor growth rate? The tumor was situated near the right breast which undergoes changes during pregnancy and it is reasonable to be lieve that activation did occur as a result of pregnancy.

Unfortunately, microscopic examination was not done so the exact histology could not be ascertained. It could he assumed to he a sar coma from x ray examination and case bistory Drd the malignant growth result from meta bolic and hormonal changes brought about as the result of gestation? One case cannot answer the question

Chondromy.xosarcoma Five cases of chon dromy.xosarcoma were mentioned in a preceding section. In 3 instances the growth rate of the tumor was mentioned. In Vaille's, Jardine's, and Lederer's cases the tumor grew rapidly. Apparently then, pregnancy seems to

accelerate the growth of some tumors. The problem of therapy is difficult. If seen late in pregnancy, delivery followed by deep x ray therapy should be done. The manner of ac couchement ideally would be abdominal hysterotomy at which time hippsy material could be obtained. In the cases discovered early in pregnancy the problem becomes difficult. The tumors apparently grow rapidly under the influence of a pregnancy and should one per form an ahortion in an attempt to save the mother when our present therapy is so hope less? Deep x ray therapy during pregnancy is not indicated as abortion or damage to the child occurs In some instances it might be better to consider the future of the child than that of the mother Every case, certainly, should be considered individually and the wishes of the patient and family given careful consideration

FRACTURES

It has heen previously recorded that injury or trauma was one of the etological factors in the production of timors of the exostosis group. The tissue injured or traumatized in these cases where there is no evidence of bone fracture is precartilaginous connective tissue Interesting cases have been reported by Blat ner, Winchel (§1), and See and Tamies.

CASE 5 University Hospital No 51005 The patient a married white female aged 27 years primingravida, was admitted to the hospital Novem ber 10 1935 in labor In 1923 7 years prior daministon the patient was in an automobile accident sustaining a fracture of the pelvis and rupture of the bladder. She made an uneventful recovery from the accident. She married in 1931 and this was the first setation. The last period occurred February 11-34 gestation. The last period occurred February 11-34

The general examination was essentially negative. The abdomen was enlarged by a full term pregnance the presentation and position being diagnosed as left occipit posterior with head well fixed in the pelvinellet. The external pelvic measurements were within normal limits. A vaginal examination was done because of the history of pelvic fracture. On the descending ramus of the pulsic bone a projection was discovered.

A roentgenogram of the pelvis was made (Fig. 3) An anteroposterior roentgenogram with patient in the semisting position showed a true conjugate of rocentimeters left oblique diameter 9.5 centimeters, and the right oblique of ro centimeters with the letus presenting with the occiput to the left

Labor was prolonged, the duration being 41 hours and 5 minutes, the first stage alone lasting 37 hours The delivery was spontaneous There was consider able molding of the head Convalescence and puer perium were uneventful

SARCOMA

In addition to the chondrosarcomas previ ously mentioned, Muller under the titles of "Sarcoma" and "Carcinoma" mentions 9 cases Daubeuf, Lauwers, Zeller, Lees, Barnes and Barnes, and Hardouin and Brault, each report 1 case and Cragin mentions 2 cases

Vaille states that these tumors grow rapidly during pregnancy and that some of them become much softer during the puerperium A study of the cases was made with these statements in mind. In the 17 cases cited from the literature, tumor growth was observed clini cally to be rapid in q instances (55, 56, 58, 59, 60, 6r, 64, 66, 68), but it is difficult to determine or to state with any degree of accuracy that the growth rate was influenced by preg nancy and/or the puerperium Three patients (57, 63, 60) died as a result of cesarean section and tumor growth rate was not noted in these or the other 5 eases

The following ease, one of fibrosarcoma of the left femur, was observed prior to, and

through, a pregnancy

Case 6 University Hospital No 50379 The patient, a white female aged 30 years, was admitted to the University Hospital March 11 1933 About 18 months prior to admission she noticed a lump in the upper part of the left leg She then noticed some weakness in the leg but had no pains until about 2 months prior to admission when she twisted her leg Following this there was an increase in the size of the lump There was a loss of 9 pounds in 2 years

The patient was an emaciated white girl whose general physical examination was essentially neg ative Locally the upper third of the left thigh showed a fusiform enlargement, more marked on the antenor, than on the posterior surface. The enlarge ment measured 24 inches in circumference as com pared with the 10 inch circumference of the right thigh The length of the left leg was 32 inches, the right 35 inches

Roentgenogram (Fig 4) showed a large tumor mass in the soft tissues of the upper thigh, with some irregularity of contour especially in its medical aspect There has apparently heen an extension of the new growth into the greater and lesser trochanter of the femur at which point there has been some bone destruction with several spicules of the bone extend ing into the soft tissues in the region of the lesser



descending ramus of the puhis, on the right with some displacement deformity of the latter associated with calci fication of excess cartilage at point of union

trochanter There appears to he some involvement also along the under surface of the femur with some narrowing of the femoral neck. The bones of the pelvis head of the femur, and the greater trochanter show marked decalcification

A biopsy was done March 16th 1033 and the diagnosis was fibrosarcoma with a high degree of malignancy

Patient was given a course of deep v ray radiation with 600 r units through four ports of the femur She was dismissed on April r, 1933 She returned to the x ray department from time to time for x ray

treatments (Fig. 5)

She occasionally had periods of amenorrhea which were not present prior to radiation. She had a normal period beginning September 15, 1934, and then amenorrhea She was not seen from October 1034, until April, 1935, when she again presented herself She complained of recurrence of pain especially upon walking neakness, growth of the tumor, and enlargement of the abdomen Pregnancy was suspected and a roentgenogram of the abdomen revealed a fetus (Fig 6)

She delivered spontaneously on May 10, 1035, the infant was normal and survived She was readmitted to the hospital on June 6, 1935 complaining of rapid growth of the tumor since her delivery. There was no pain The tumor mass measured 28 inches in circumference and there was a 20 degree contraction

of the knee (Fig 7)

X-ray examination revealed that the soft tissues of the upper left thigh were increased in density and size and multiple shadows (?) were noted along the femoral shaft and through the soft tissues about and below the new growth which had destroyed all the section of the upper femoral shaft extending from the trochanteric region to a point 15 centimeters below There is a sequestered fragment of the femoral shaft 20 by 4 millimeters lying 1 5 centimeters medial to the lesser trochanteric area. The femoral shaft through this region shows multiple areas of hone destruction, which appear to extend down along the cortex giving it a moth eaten appearance. There are no apparent metastases in the lung fields or skeletal structures visualized

The blood hemoglobin was 40 per cent (Sahli) red blood cells 2,270 coo while blood cells, 7,500 She was given two blood transfusions of 250 cubic centu meters each No further roentgenogram was given because of the condition of the overlying skin Patient was dismissed. She died about it vear later

The growth of the tumor as observed by the vrav. re decalcification of the bone, was increased during pregnancy and puerperium As judged by clinical symptomatology the patient was definitely worse as a result of the gestation and by actual measurement the tumor had increased in size. Because of the close proximity of this tumor to the pelvic girdle might not the conclusion be drawn that what happened in this tumor might also happen in similar tumors of the pelvic girdle? How these alterations in growth and decalci fication are brought about, whether by preg nancy with its altered hormones, by change in vascular supply, by the physiological changes in calcium metabolism or by all three factors is, of course, open to discussion

TRE LTMENT

In general the obstetrical treatment will depend upon the durition of gestation and the amount of pelve disproportion. Vaille recommends cesarean in all cases for fear of the trauma sustained during delivers activating the tumor or causing metastatic lesions. Lauwers attempted removal of a fibrosarcoma when the patient was in her eighteenth week of gestation. The tumor was removed, the patient however aborted on the third postoperative day. She survived both mendents, but the author concludes "that there will probably be a recurrence of the tumor within a short time."

Hardouin and Brault treated their patient with deep via therapy trying to protect the child with lead sheets. The child, however, when delivered at the seventh and one half month of gestation, lived only 4½ hours, the postmortem revealing a profuse sclerosis evidently due to radiotherapy. Two months after delivers the patient's general condition was much worse and it was evident that she would not long survive. This single case cer tainly emphasizes the fact that radiotherapy scontra indicated in the treatment of pelvic

osseous tumors if the pregnancy is to be continued

The problem of interruption of the pregnance with subsequent surgery or radiation, therapy should be considered only in early gestation, but each case should be considered on its own ments. With our present inadequate therapy of these tumors are we justified in sacrificing both lives? Lees, in 1895 made the observation that it is fortunate for the fetus that the majority of these tumors are discovered late in pregnancy.

GENERALIZED OSIEITIS FIBROSA CUSTICA AND HYPERPARATHUROIDISM

Generalized ostetis fibrosa cystica or von Recklinghausen's disease is most frequently seen in cases of hyperparathyroidism may evist possible that byperparathyroidism may evist in the absence of hypercaleemia, for the parathyroids are only one factor in the mainte anaeco of the serum calcum level. The reverse may also be true that hypercalcemia may evist

with normal or hypoparathy roidism Pregnancy apparently aggravates the con dition the parathyroid activity being increased so that further decalcincation occurs. The available calcium is used by the fetus and none or very little can be utilized by the mother Hyperparathy roidism tends to raise the serum calcium The pregnancy per se tends to lower it Blood calcium readings might in some instances be most confusing. The result of course, would depend upon which one of the two factors was dominant. In very mild cases, hyperparathyroidism in the sense of increased functional activity as a result of the pregnancy might exist without hypercalcemia, or indeed, in the presence of low values of serum cal cum (82)

Five cases have been reported in the literature (71 73 74 76)

One case of osterus tibrosa cystica without hyperparathyroidism had been observed at the University of Nebraska Hospital

CASE 7 University Ho pital No 37406 The patient aged 31 years, while housewife was admitted to the University Hospital January 6 1932 with the following history. Following a leg injury at the age of 3 years she has had recurrent attacks of pain in the left hip. She began to mensituate at the

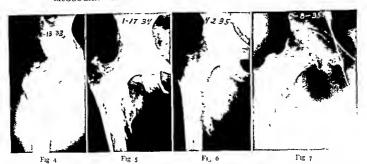


Fig 4 Fibrosarcoma of the left femur showing extension of the new growth into the lesser trochanter, and spicules of bone extending into the soft tissue

Fig 5 Fibrosarcoma of femur Appearance 10 months later after radiation showing calcification in the region of the bony proliferation medially to and surrounding the lesser trochanter

age of 13 (1914) and noticed that the discomfort in her hip was always worse at that time She married in 1920 at the age of 19 She became pregnant in February, 1021 and shortly after began to complain of severe pain increasing in severity as pregnancy progressed She delivered a full term child in November, 1921, and had a second child just one year later in November, 1922 During the second pregnancy the pain in the hip was more severe than that which occurred during the first pregnancy Following the second pregnancy the pain became steadily worse coming on in attacks and each attack lasting about 1 month During 1923 and 1921 there occurred occasional pains in the left tibia and the patient noticed a gradual bowing of the femur with the convents outward

She entered the dispensary of the University August 28 1924, with the complaint stated A roentgenogram was taken with the following report 'Multilocular cysts' involving almost the entire upper third of the left femur, and the ramus of the ischium and pubis. There is an incomplete fracture of the shaft of the femur at the junction of the upper and middle third.

The patient was admitted to the hospital on September 8, 1924, and before an application of a cast could be done she suffered a spontaneous frac ture, with 6 inches of overlapping. The patient made a very slow recovery and it was not until 1929 that the patient felt well and could walk with little or no limp. During that vear and 1930 she felt very well and had practically no discomfort.

A regular period occurred April 25-30, 1931, fol lowing which there was amenorrhea Within 2 few

Fig. 6 Fibrosarcoma of the femur Appearance 25 months after first film patient than being 7 months pregnant Increased destruction of bone present. The cortex previously well calcified and sclerotic now appears irregularly invaded through the medial half of the shaft.

Fig 7 Fibrosarcoma of the femur Appearance r month postpartum, marked destruction of upper femoral shaft

weeks of the last period there was a recurrence of the pain in the hip. The patient was able to do her usual light household duties for the next 3 months. During the fourth month of gestation the patient could not bear weight on the left leg without causing pain in the left hip. This continued for 2 months and then diminished somewhat

Examination showed a well nourished, well developed female who walked with a decided limp, favoring the left leg. There was some enlargement in the neck of the femur. There was shortening of 1 inch. Motion was slightly limited in all planes.

The remainder of the examination was not remarkable except for the gestational tumor which filled the

abdomen The fetal head was floating above the pelvis brim, the position a left occiput anterior The blood serum contained 5.5 milligrams of

pbosphorus per 100 cubic centimeters and 11 milligrams of calcium per 100 cubic centimeters. Other laboratory examinations were within normal limits X ray study (Tigs. 8 and 9) of the left femur and

the tibia and fibula showed the normal trabeculations through the upper half of the femoral shaft to have been replaced by an irregular cystic lesion which has expanded the width of the shaft and narrowed the cortex, this extends from the epi physical line downward to the middle of the shaft. There appears to have been an old fracture in the sultrochantene region through the cyst. The cyst is crossed irregularly by aberrant trabeculæ. A study of the peliys shows the left pubis and

schum to be involved by a similar lesion giving an expansion of the bone decalcification of its sub stance in an irregular manner with thinning of the

cortex and loss of the normal traheculæ. The left acetabulum protrudes into the pelve inlet narrowing its diameter by about 15 millimeters from the left acetabulum to the right sacro iliac synchondrosis. There is all o decalification through the right pubs suggestive of less advanced cystic changes.

A study of the left leg shows a similar lesion extending throughout the shaft of the tihia and a small central cyclic area in the middle of the shaft

of the fibula (Fig o) There is about 5 degrees of medial bowing of the tibia and fibula

Impresson Ostenic fibros cyclica old pathological fracture through the left femura and marrowing of the pelvis in its right tolque diameter has about 15 or 20 millimeters. She was seen in consultation by Dr. Herman Johnson of the orthoped depart ment who advised abdominal historotomy and sterinization because of the evidence of slow progressive character of the process apparently increasing with each pregnancy and the posibility of other fractures occurring during delivery through matural channels.

On January 10 1932 the patient heggs to have a few regular low abdommal pans and a classical cesarean section with salpingotomy was performed synnal anesthesi being used. The child was of the male eer cried pontaneously and was normal except for a slight elongation of the middle too of each foot a characteristic found in its mother and maternal grandfather. The patient made as nucre-entity recov-

en and was dismi sed on January 24 1932.

Re-examination was done on June 18 1932. The patient felt well but had continued to have recurring attracks of pain in the left hip short in duration and not severe if her activities were somewhat restrained. She had been instructed to take calcium lactate of and viosered daily. She had not followed instructions rigidly but was definitely certain that the pain was always were et he descontinued her medication.

On May 9 1934 the blood serum contained 5 milligrams of phosphorus per 100 cubic centimeters

and it milligrams of calcium

The reported case hecause of the blood chemistry is one which is not easily classified As already mentioned a hyperparathyroidism may exist in the absence of a hypercalcemia and the diagnosis is confirmed or disproved hy the examination of the serum phosphoric eri tase which is increased. It is also possible—at least theoretically -that in certain cases there would appear a remission of hyperactivity of the parathyroids and during such a time as the remission was present the blood findings would be approximately within normal limits Such a possibility is suggested in Bevere and Sorrentino's case which received only a course of hormone therapy over a period of 30 days and remained well The case presented might possibly have been in a quiescent stage, the symptoms aggravated somewhat by pregnance but not accelerated, the parathyroids remain ing within the normal limits of activity as judged by the blood chemistry studies.

Pregnancy or the puerperium apparenth, aggravates the condition as shown in the reported cases. Pregnancy should not be under taken hy women affected with the disease. If the woman does become pregnant all measures should be undertaken to effect a cure, and while heing studied or treated precaurion should be used to prevent a pathological fracture. Delivery should be accomplished in a manner that is safe to hoth mother and child

Therapeutic ahortion early in pregnancy might be considered but at present there is insufficient evidence to warrant or support

such a procedure

Two of the reported cases (74, 76) showed their onset following spontaneous interruption of the gestation hence cessation of pregnance

will not always allay the process

Future pregnancies in cases that are not cured should be avoided and in the cured cases prohably may be undertaken without undue risks it they are properly spaced as to time interval

SOLITARY CYSTS

The solitary hone cysts are common in young people, usually under 21 (75) and should be seen occasionally in the pregnant woman. However such a combination is apparently very rare. The following case report is therefore unique.

Case 8 The patient a young white female aged 23 years was first seen by Dr Schrock and Dr Johnson on May 28 1933 At that time she said she had noticed a gradual swelling in the lower end of the right ulna since August 1931 She had a normal period in January 1933 and then amenorthea Since the onset of her pregnancy the swelling has increased more rapidly Examination revealed a fusiform thickening of the lower right forearm on the ulnar side. The patient is approximately 4 months preg nant \ ray examination showed a multilocular event tumor of the lower 3 inches of the ulna (Fig. 10) She was given a course of deep x ray therapy with some regression of the ize of the tumor. The patient delivered in October 1933 but due to a contracted pelvis the child was stillborn Following delivery there was a further decrease in size of the



Fig 8 Osteitis fibrosa cystica Irregular cystic lesions have replaced the upper half of the left femur Similar lesions are present in the left pubis and ischium The left acetabulum protrudes into the pelvic canal

tumor An examination done on September 16, 1935 showed a completely functional wrist with excellent contour. The x ray showed the process to be entirely arrested

The growth rate of this tumor was apparently accelerated by the onset of a pregnancy with its attendant bodily changes in the calcium metabolism and activity of the endocrines, especially that of the parathyroids Unfortunately, blood calcium studies were not made

The tumor growth responded to the accepted type of therapy, not requiring an increase in the dosage Solitary cysts, therefore—at least in this one case—have an increased growth rate during pregnancy, respond to the accepted therapy, and are not an indication for an interruption of a gestation

CANCER-PRIMARY AND METASTATIC

Cancer of the bone may be either primary or secondary and its occurrence in a pregnancy is most rare Metastatic lesions of the bone are most common in the female and usually are secondary to breast malignancies. The majority of such cases, however, occur late in the childbearing era, accounting for a large part of the infrequency of the complication.

One case of "primary carcinoma" of the sacrum was reported by Berry, in 1886, and is famous, for it is apparently the only instance



 $\Gamma_{\rm ig}$ 9. Osteitis fibrova cysticn. Fibula and tibia of the same patient

He does not state whether or not the pregnancy affected the growth of the tumor

Jarcho mentions an instance of multiple metastatic lesions of the skeleton in a woman of 25 who had had a mastectomy done for carcinoma 18 months prior to admission to the hospital Large metastatic lesions were demonstrated in the pelvis by pelvic examination and by x-ray. These tumors obstructed the birth canal, and the patient was delivered by cesarean section. Again there is no statement made as to how the progress of the disease was affected by the pregnancy.

CASE 9 History through courtes; of Dr R Schrock and Dr H Johnson Ihe patient was a white female, aged 35 years, who was first seen on December 27, 1933 She gave the history of a mastectomy performed in 1936 for a carcinoma of the hreast She had been well until September, 1933, when she twisted her right upper leg and hip There was some pain at the time of the injury, and this had progressed and she walked with a slight limp Roenigenograms revealed a pathological absorption of the neck of the right femur secondary to carcinoma of the breast About 600 r units of deep



Fig. 10. Solitary hone ex t of distallend of the left ulna, howing regression of tumor under treat ment during pregnancy and puerpernum

x ray therapy were delivered anteriorly and poste riorly over the region of the right hip. During the first 8 weeks following the treatment there was relief of pain On March 14 1034 the returned complaining of pain in the hip associated with some difficulty in the use of the right leg and thigh Flu oroscopic examination showed no gross deposits in the chest \ ray examination of the hips was done and the coxa vara at the right femoral neck had been incre2 ced A roentgenogram of the lumbosacral pine was made \o abnormality was found but a fetal skeleton was demon trated. The patient ad mitted the po sibility of pregnancy and tated that her last period had occurred 5 months previou ly The patient then visited another city where a thera peutic ahortion was done the consultant heing of the opinion that the pregnancy was definitely affecting the progress of the di ease. She was seen again May 23 1034 The pain in the hip was increased and in addition some swelling was present in the right hip Over the hip region ooo r units were admini tered

Fig. 11. Meta, tatic carcinoma of the right shum. Ante roposterior study of the pelvis showing irregular destruction of the right shum.

and a sterilization dose of roentgen therapy was ad ministered over the pelvis. The patient continued to fail and died one year later from exten ive pul monary metastases.

CASE to University Hospital No 52476 The patient white married female aged 30 year was admitted to the University Ho-pital January ... 1936 The patient states that on or about September or October 1034 he noticed a hard nodule in the upper outer quadrant of the right brea t. In Fehru ary 1035 a radical ma tectomy was done 4 month after her de missal she developed a backache in the lumbo-acral area which has per i ted. On Max .4 toss she had a regular normal period and then a total amenorrhes About the same time she noted a cabbing of the lower angle of the wound and in September pus began to drain from this area Exam mation revealed a recurrence of the original lesion for which she was given deep x ray therapy. In spite of treatment the le-ton continued to grow and a few hard masses ap seared in the infraclavicular and

aniliar areas. The prepanes developed normally the only dimculty being a rheumatic feeling in the hips and lower back, loss, of appetite and las stude. She fell into labor on Jaman; 20.1036 and after a 2 hour labor was delivered spontaneously. She was admitted to the University HO-patal for care of herself and her premature miss.

The patient was a moderately well nour hele female so vests of age. The face was thin and her checks were cunken. The neck was negative. The left breast showed no may es or scar. The right breast had been removed and there was an area of superhead ulceration about to be 14 centimeters in size. Small round pea-sized nodales were scattered along the line of the into ion, and the class of the control of the control of the control of the moderate of the control of the control of the moderate of the control of the control of the moderate of the longs were clear the heart was necessive. The blood pressure was 128 for The lower edge of the liver was palpable and extended three fingers breadth below the costal margin The liver felt nodular and pressure over the liver area caused the patient some pain. The spleen and kidneys were not palpable. The fundus of the uterus was slightly below the level of the umbilicus The extremities were negative, with no deformities, edema, or varicosities The reflexes were all normal Laboratory examination was negative. The urine was negative, the blood hemoglobin 80 per cent (Sahlı), the red blood cells, 4,270,000 and white blood cells 14,800

Roentgenograms of the skeleton were done by Dr

H B Hunt

"Anteroposterior radiographic study of the dorsal lumbar spine and pelvis shows irregular destruction of the right ilium above the acetabulum and an area of destruction in the ninth rib posteriorly indicating metastases. No gross destruction or collapse of the vertebral bodies was discerned, the hilar and perihilar markings were accentuated bilaterally, which is also consistent with metastases Small areas of destruc tion are suggested in the upper end of the right tibia, and the junction of the upper and middle third of the left bumerus consistent with metastases"

The patient was not permitted to lactate She was dismissed after 17 days of observation, her only treatment being sufficient v rav theraps to inactivate the ovaries. The child gained well on artificial formula and was dismissed in good condition

Dawson, Lee, Kilgore, and Trout, all present eases in which the growth of the primary and secondary lesions in careinoma of the breast was apparently rapid after or during the incident of pregnancy and/or lactation There are no instances of the occurrence of a pregnancy after the appearance of bone metastases in their series

Lee advises sterilization by radiotherapy of women treated for mammary carcinoma before the menopause or the interruption at an early stage of a subsequent pregnancy

Geschickter, in discussing skeletal metastases in carcinoma of the mamma, states that the interval between the appearance of the primary tumor and the appearance of the metastases to bone was 321/2 months, and that the duration of life thereafter was from 7 to 18 months, depending upon the type of tumor and the radiation. In the first case the time interval was 3 years and the duration of life afterward was 18 months It is doubtful if the pregnancy in this instance lent any acceleration to the progress of the disease Certainly the interruption of the pregnancy did not allay the rapidity of the tumor growth, for the patient lived 18 months, the same time (theoretically at least) as she would have lived had she not been pregnant

A review of the first case raises the question as to the therapeutic value of abortion in this type of case The prognosis is already extremely poor, and should one sacrifice both individuals in an effort to save one-especially one who already has a hopeless prognosis?

In the second case the evidence of local recurrence and the occurrence of the pregnancy were almost simultaneous Undoubtedly in this instance the pregnancy did, through its hormones accelerate the growth rate of the tumor The mactivation of the ovaries at the time of the masteetomy, or a very early therapeutic abortion might have given the patient a longer life span

The performing of a therapeutic abortion after the occurrence of bone lesions seems to the author to be contra-indicated except in those eases of seirrhus earemoma of the breast in which bone lesions oceasionally exist for many years, the host comfortable and requir-

ing little or no therapy

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Fig 10 Solitary bone cyst of distal end of the left ulna showing regression of tumor under treat ment during pregnancy and puerperium

x ray therapy were delivered anteriorly and po te tiorly over the region of the right hip. During the first 8 weeks following the treatment there was reliel of pain On March 14 1934 she returned complaining of pain in the hip associated with some difficulty in the use of the right leg and thigh. Flu oroscopie examination showed no gross deposits in the chest \ ray examination of the hips was done and the coxa vara at the right femoral neck had been increased A roentgenogram of the lumbosacral spine was made \o abnormality was lound but a fetal skeleton was demonstrated. The patient admitted the possibility of pregnancy and stated that her last period had occurred 5 months previously The patient then visited another city where a thera peutic abortion was done the consultant heing of the opinion that the pregnancy was definitely affecting the progress of the di ease. She was seen again May 23 1934 The pain in the hip was increa ed and in addition some swelling was present in the right hip Over the hip region 900 r units were administered

Fig. 11 Meta tatic carcinoma of the right ilium. Ante roposterior study of the pelvis showing irregular destruction of the right ilium.

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monary metastases Case to University Hospital to 52476 The patient white married female aged 30 years was admitted to the University Hospital January 21 1016 The patient states that on or about September or October 1034 she noticed a hard nodule in the upper outer quadrant of the right breast. In Febru ary 1935 a radical mastectomy was done. A month after her dismi sal she developed a hackache in the lumbosacral area which has per isted. On May 24 1935 she had a regular normal period and then a total amenorrhea About the same time she noted a scabbing of the lower angle of the wound and in September ous began to drain from this area Exam mation revealed a recurrence of the original lesion for which she was given deep x ray therapy. To spite of treatment the lesion continued to grow, and a few hard masses appeared in the infraclavicular and axillary areas

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EXPERIMENTAL DUODENAL ULCER

I Γ VOLINI, M D, H L WIDENHORN, M D, and B I INLAYSON, M D, Chicago, Illinois

HERE have been many references within the past few years to the production of experimental gastro-intestinal ulcers by various methods The original article of Exalto in 1911 gave the first technique for the almost constant formation of these experimental ulcers by the operation known as "surgical duodenal drainage" This operative procedure consists, first, of severing the proximal and distal ends of the duodenum, these ends are then inverted and closed A small portion, about 11/2 to 2 centimeters of the pylone part of the stomach, is resected This pylorectomy is done mainly for technical reasons, as the inversion and closure of the gastric and duodenal opening is easier and safer when the rigid muscular layer of the pylorus is removed. The pyloric end of the stomach and the proximal end of the jejunum are closed separately The lower distal part of the isolated duodenum is then transplanted to the ascending colon by a lateral anastomosis Then a gastrojejunostomy is performed, in order to restore the gastro intestinal continuity after the entire duodenal loop with its biliary and pancreatic ducts is isolated. Thus the gastric juice and food are drained into the jejunum while the duodenal secretion with the bile and the pancreatic juice flows directly into the ascending colon

Mann and Williamson in 1923 varied this technique by inserting the isolated duodenum into the distal ileum. The Exalto and Mann Williamson techniques produce almost 100 per cent of positive ulcers in the jejunum or ileum Confirmation of these results have been reported by Steinberg, Ivy, Graves, Harper, Dragstedt, McCann, Aron and Weiss, Morton, O'Shaughnessy The majority of these observers have recorded the finding of acute and subacute ulcers with less frequent observation of the typical chronic gastrojeiunal ulcer

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It is significant that the majority of observers (Stemberg, Haberer, Berg, Graves, Dragstedt, Mann and Williamson) using the operative techniques described lean to the acid peptic digestion theory of ulcer production citing as the experimental evidence the constancy of ulcer formation after the Exalto operation which means the complete exclusion of the duodenum. The duodenum and its secretions, the major ulcer inhibiting factors, are removed from the normal digestive processes The alkaline duodenal contents are not present to neutralize the acid peptic digestive factor Ulcer then results from digestion by the acid gastric juice. Acid is the important factor always stressed Dragstedt showed the protective action of the duodenal secretion in preventing jejunal and ileal ulcers by varying the Lyalto Mann operation in the following manner he transplanted the duodenal loop closer to the gastrojejunal anastomosis implanting the duodenum into the jejunum only 40 to 50 centimeters distant from the ligament of Treitz Thus the duodenal secretions are in sufficient proximity to the gastrojejunal anastomosis to neutralize the acid gastric juice He was able to prevent the ulcer formation in 20 of 21 dogs

Variation in ulcer formation susceptibility for different portions of the gastro-intestinal tract is well known to investigators relative resistance of the duodenum is particularly called attention to by many observers and therefore its removal by surgical duodenal dramage is insisted upon for ulcer production in the ileum or jejunum deductions from all these experimental evidences naturally give the acid peptic digestion the foremost role in ulcer production We quote from Dragstedt

The work of Exalto and of Mann and his associates provided for the first time a method for the regular production of ulcers in the intestines of dogs, without the use of external corrosive agents Their finding that the diversion of bile and pancreatic juice to the exterior or into the lower ileum would lead to the development of perforating ulcers in that part of the



Fig. 1 Dog 6 Specimen obtained at autopsy, after the dog had lived 26 days. Evalto operation. I en small ulcers in the stomach one large ulcer below the gastto jejunos tomy with slightly infiltrated edges of the more chronic type of ulcer.



Fig 2 Dog 13 lived 31 days Specimen shows two debnite jejunal ulcers below the gastrojejunal anastomosis after Evalto operation





Fig 3 Dog 1 lived 27 days after Exalto operation Specimen shows the isolated duodenum with 6 definite ulcers. At the left end are the inverted duodenal stumps



lig ; Dog 25 lived 4 days after Evalto operation Specimen shows the gastrojejinostomy with an ulcer on the stomach sade one ulcer just below the anastomosis in the jejinium a part of the illum is put on to it (to save space) showing also an tileal ulcer. Below there is the isolated duodenal loop showing the inverted proximal stump and 6 douben'l ulcers.



Fig 5 Dog 27 Photomicrograph of duodenal ulcer Loss of mucosa and submucosa is shown



Figs 6 and 7 Dog 27 Higher magnification Absence of mucosa with connective tissue infiltration

small intestine which first receives the gastric content has been amply confirmed. There seems no reason to question the view that it is the neutralizing effect of the alkaline pancreatic juice which normally protects the duodenal mucosa from the acid gastric content.

In a careful study of these various articles we have been unable to find one single reference to the finding of any type of ulcers in the excluded duodenal loop where the Exalto or Mann Williamson technique alone were used

We now report our observations on 45 experimental animals in which postmortem examination revealed in 28 instances one or more ulcers of the acute, subacute, or chronic type in the transplanted duodenal loop

The Exalto technique was used in 30 of these animals, the Mann Williamson in 12, and the Dragstedt type of operation in 3 There was no significant variation in the number or character of the duodenal ulcers in the three types of operative procedures. These animals lived from a minimum of 4 to a maximum of 180 days. Some were sacrificed for the postmortem studies while they were still in good condition, while in others the examinations were made shortly after death

The following description applies to the findings in the isolated duodenal loop uleers, unless otherwise specifically stated ulcers varied in number from 2 to 5 only I instance was only one uleer found The ulcerations were principally in two locations the first site about 2 centimeters from the main panereatic duct opening, the other on the duodenal side close to the anastomotic opening with the colon or with the ileum These ulcers were circular or oval in shape, and varied in size from a few millimeters to 15 centimeters in diameter The ulcers were well defined, clear cut, clean in appearance, punched out without undermining, and showed no tendency to perforate, at least within the time limits observed. The tendency to bemorrhage was quite pronounced In fact, 3 of the animals died from copious hemorrhage from the duodenal ulcerations

The accompanying photographs of the gross specimen (Figs 1, 2, 3, 4) illustrate the descriptive features mentioned above

The microscopic examination reveals the evidence of acute and subacute types of duo dunal ulcerations with loss of mucosa, extending occasionally through the submucosa, a surrounding inflammatory zone with a pronounced hyperemia and distention of adjacent blood vessels. Evidence of chronicity was definitely lacking in most of the microscopic sections examined although a tendency to fibrous infiltration was noted, while in a few specimens much connective tissue was evidence of chronic ulceration. The photomicrographs illustrate the microscopic evidence (Figs. 5, 6, 7)

It is to be noted here that most of these animals had, in addition to the duodenal ulcers described, lesions in the jejunum at the anastomosis and just below the anastomosis, and ileum, some of which were of a chronic type. A few animals showed, in addition, gastric ulcerations. These latter findings confirm the earlier observations of the efficacy of the production of experimental gastrointestinal ulcers by the Evalto and Mann.

Williamson technique

A control study of the duodenums from 22 apparently normal dogs revealed the presence in 17 animals of circular or elliptical depressions, 2 to 15 millimeters in diameter These varied in number from 2 to o Microscopically these punched out depressions were in every instance covered by intact normal duodenal mucosa, there was no evidence of lymphatic aggregation so that these are not lymph follicles It is possible that the experimental ulcers described developed at these depressed sites Bradley, in his recent book The Topographical Anatomy of the Dog, makes no mention of such findings in the duodenum shall report a larger series with description of the duodenum of the normal dog, with detailed microscopic evidence in order to prevent any confusion that these normal findings are ulcerations

We find it difficult to explain the reason for the lack of reference in the voluminous ilterature to the presence of ulcerations in the duodenal loop which we describe as such frequent evidence. No doubt the rather tardy appearance of the upper intestinal ulcers concentrated the attention of investigators, so that little heed was paid to the examination of the lower bowel and the duodenal transplant. The duodenal ulcers appear soon after the operation and become smaller and less numerous in the longer surviving animals.

Experimentally there are three significant factors in the development of ulcers first, the mechanical or traumatic factor, second, the susceptibility of the mucosa, and third the chemical factor, free acid plus gastric proteclytic enzymes.

It is difficult to place the etiology of these duodenal ulcers. Is it operative trauma. The same or even greater degree of trauma occurred in the stomach or upper bowel where the ulcer percentage was much lower. The duodenal ulcers appeared in the non trauma tized portion of the duodenum. The vascular supply was not disturbed and no evidence supports this possibility. We furthermore paid particular attention during our operative procedures not to injure the duodenal loop or the pancreas The food traumatic factor should be evident, but these findings appeared in animals which had not received solid food and the duodenum on examination did not. in any instance, even in the long surviving animals show the presence of undigested food within its lumen

The acid digestion of the transplanted duodenium could be the cause of the experimental ulcers. However, the experimental animal shows considerable immunity to duodenal ulcers by an technique Duodenal ulcers are otherwise very difficult to produce except by direct injection of the duodenal wall by various corroding agents. The alkaline duodenal contents are quoted as being the principal protective mechanicm.

The absence of free and rules usually against ulcer development. The ulcers then would develop on a chemical basis due to a removal of or interference with the normal neutralizing effect of the alkaline duodenal secretions on gastine acidity. You Haberry found 17 per cent of patients developed jejunal ulcer following gastine jejunostom when pyloric occlusion was pre-ent whereas marginal ulcers occurred in less than 1 per cent when there was no occlusion. Dott and Lim continued these incluses in experimental

animals. Our animals, horever developed ulders in the duodenum far removed from gastric and and gastric contents with the flow of the fluid from the duodenum to the color rather than vice versa. Charles Mavo daims that 78 per cent of ulcers occur in the duodenum in spite of the alkalimity of the duodenal Secretions.

Bile is frequently acid in reaction and no. an alkaline secretion. Normally pancreatic juice by reflux through the pylorus probably produces neutralization on the proximal rather than the distal side of the pylonia. The e statements presume alkalinity of the duodenal contents. Mann and Bollman report especially in fasting animals very high acid readings of the duodenal content, usually temporary in duration. We have continued these observations in a few of our animals, practically all those examined showing acid duodenal contents even though the duodenal loop is far removed from the stomach by the operative procedure. These latter findings confu-e still further the interpretation of the experimental undings demonstrated in our animals. Until the hydrogen ion concentration determinations were made acid direction seemed quite remote as an etiological positi

The extensive literature on experimental ulter reveals many methods of ulter productron by the use of bacteria (Rosenov Tuerk Hardt1 and toxic and corroding substances (Ivv. O Shaughness), Pavr by nerve trauma turn (Cohnheim) by vascular injuries (Kleb-Rokitan ky Virchow, and by removal of specine glands such as thyroid (Friedman) adrenals (Widenhorn) and pancreas (Elman and Hartman: Operative procedures of the mutilating and unphysological character such as the Exalto Mann Williamson tech niques have been shown to render intestinal alcers most dennitely. Most of the alcers so produced are of the acute and subscute types and appear soon after the experimental procedure. Our work connrms the fact that the Exalto and the Mann Williamson procedures are so far as we know today the best and most dependable methods of producing jejunal ulcers in pract cally 100 per cent of the expen ments. We are not able as yet to explain

satisfactorily the etiology of our findings of duodenal ulcers This work is to be continued and further research by other co-workers is to he stimulated The production of experimental duodenal ulcers has not been reported in the literature, our findings we believed, warrant this short report

SIMMAPA

- 1 Two procedures are discussed by which we have been able to produce experimentally jejunal ulcers (a) the Lxalto method, (b) the Mann Williamson method
- 2 Our findings in 45 dog experiments confirm recent reports, that both methods render intestinal ulcers in 100 per cent of the animals
- 3 Special attention has been paid to the excluded duodenum, in which we have been able to produce typical acute and subacute and chronic ulcers, varying in size (2 to 15 millimeters) and number These duodenal ulters were a frequent finding in 28 of 45 dogs operated upon
- 4 Punched out depressions occurring in the duodenum of the normal dog are reported Grossly these suggest ulcers but the microscopic examination reveals normal intact mucosa
- 5 The formation of duodenal ulcers in the experimental animal has not been reported in the literature, as far as it has been available to us

6 The chology of these ulcers is discussed without as yet a satisfactory explanation to its possible causes Trauma should be dismissed as the causative factor

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CARCINOMA OF THE PANCREAS

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ARTICULARLY during the last few years, when an unusually large number of cases have come under our care, we have been impressed with three things ahout carcinoma of the pancreas. In the first place, it is relatively frequent, considerably more frequent, in fact, than it is generally supposed to he In the second place, there is an absence of any reliable criteria of diagnosis except in jaundiced cases. In the third place, the surgeons of this community, ourselves in cluded, are employing for it no method of treatment which offers the slightest prospect of cure

The classic syndrome of painless jaundice, cachevia, and distention of the gall bladder leads to the suspicion of carcinoma of the pan creas, it is true, but that does not cover the situation For one thing, by no means all cases involving the head of the gland present this syndrome, and none of the cases in which the hody and tail are involved are associated with it Furthermore, laboratory tests of pan creatic function as an index of the disease have so far been without very great value. Even if they should be so developed in the future that they will prove uniformly reliable, they will continue to he without value until we can establish some clinical picture which will direct our attention to the pancreas and sug gest their use

In the light of these facts, it has seemed to us worth while to study a considerable number of histories in detail, with the hope of ferret ing out some symptom or combination of symptoms which might he suggestive of the disease, if not pathognomonic of it. After we hegan our study from this standpoint, it seemed to us profitable to analyze the whole record and to make such contribution to the problem of carcinoma of the pancreas as we were able to derive from that analysis We

might add at this point that we made no at tempt to review the complete literature of the subject We did, however, study the largest series of cases of this disease on record in the literature, notably those reported or collected by Futcher, Eusterman and Wilbur, Kiefer. Friedenwald and Cullen, Leven, Mussey, Ranson, and Speed These we have used for comparison with our own figures whenever such comparisons were possible and appropriate

Our investigation, which covers the 10 year period ending December 31, 1035, includes of cases selected from the records of Chanty Hospital and Touro Infirmary in New Or leans We use the word "selected" advisedly. for this material represents not more than two thirds of the histories filed as carcinoma of the pancreas during this period in those two hospitals. We accepted only those cases proved by autopsy or supported by the convincing operative findings of competent sur geons. We rejected several cases in which the autopsy protocols were madequate or contra dictory, and we accepted cases in which au topsy was not done only if the surgeon's notes included a satisfactory description of the gross pathology We also eliminated all cases of islet carcinoma, in which the picture is defi nitely different, and all cases suspected of be ing secondary to growths elsewhere

After these eliminations there remained of cases, in 55 of which operation was done with out autopsy, in 16 of which hoth operation and autopsy were done, and in 25 of which only autopsy was done. We are convinced that all of these cases are bona fide cases of primary carcinoma of the pancreas

FREQUENCY

Any conclusions derived from our statistics as to the frequency of carcinoma of the pan creas would be grossly misleading, chiefly he cause we are quite sure that many actual cases were entirely overlooked or incorrectly ex

From the Department of Surgery of the School of Mediume of Louisiana State University and the records of Charity Hospital and Touro Infirmary in New Orleans

cluded Such errors undoubtedly prevail in any small series, and we must turn to larger groups of statistics to get any fair idea of the incidence of the disease. The studies of Hoffman and of Leven indicate an incidence of r r to 2 8 per hundred thousand deaths and an incidence of r to 2 per cent of all carcinomas.

AGE, RACE, AND SEX

The patients in our series represented an average age of 58 years, with the range from 25 to 84 years (Table I) The period of great-set frequency was from 50 to 69 years. Sixty two cases, 65 per cent of the total number, occurred in these two decades, and 88 cases, 92 5 per cent, in the period between 40 and 79 years. These figures are in accord with the large series collected by Leven which includes the 44r cases collected by Kiefer, and they are also in accord with the expected age in cidence of caneer in any organ.

There were 78 males and r8 females, a ratto of 43 to 1, the male incidence being higher than most other reports indicate. In a total of 872 personal and collected cases (Kiefer Friedenwald and Cullen Mussey, Eusterman, Leven, and our own) there were 656 males

and 266 females

Our figures show 69 white and 27 negro patients, a ratio of 25 to 1 Discarding the cases from Touro Infirmary, to which institution negroes are not admitted, the ratio is 3 to 2 (68 cases, 41 white and 27 negro). Since the proportion of white to negro admissions in Charity. Hospital has been approximately 55 to 45 for the last 10 years, there is evidently a slight preponderance of the disease in white patients. Other observers report that carcinoma of the pancreas is relatively rare in negroes. Futcher, for instance, in a report of 31 cases from Johns Hopkins Hospital, found the ratio 7 to 1, which is at wide variance with our own figures.

PATHOGENESIS

In view of its frequent association with carcinoma of the pancreas it has been suggested (Hulst, quoted by Ewing) that chronic pancreatitis is the actual cause of the malignancy We are unable to discuss this theory on the basis of our own studies, for the reason that

TABLE I —LOCATION ACCORDING TO AGE, RACE,

Age in years	Head	Head and body	Body	Tail	Def fuse	Total	Per cent age
20-29	2					2	2
30-39	3	1			ſ	5	5
45~10	8	3	r.		3	15	16
50-50	24	4	3	1	2	33	34 4
63-69	17	4	2	6	1	29	30 2
70-70	6	7	1	2		t s	17.4
Over 50	1					1	1
Total	61	14	۲	0	7	96	
Percentage	63 5	14 6	5 2	04	73		
Sex Male	47	21	4	0	7	78	817
Female	114	3	I			15	183
Race White	46	20	3	5	5	69	750
\egro	15	1	1	4	7	37	151

in these records the condition of the uninvolved tissue was not usually described When such information was available, cirrhosis of the gland and dilatation of the ducts were the chief findings, and they point, rather, to the theory that chronic pancreatitis is simply a normal concomitant, so to speak, of the malignancy and not its true cause. Malignancy and not its true cause. Malignant tumors of the panereas inevitably obstruct the ducts draining a large portion of the gland, and such an obstruction can reasonably be expected to cause fibrosis and other inflammatory changes, while such changes are likewise inevitable in the tissue adjacent to the neoplasm.

Chincal facts support us in our refusal to accept chronic pancreatitis as the cause of pancreatie malignancy. In the first place, the set incidence is against it. Chronic pancreatitis is commonly supposed to be the result of biliary disease, which in turn is supposed to be about three times as frequent in females as in males. But this series, as we have pointed out, shows a male incidence roughly four times higher than the female incidence. In the second place, the racial incidence is against it. Gall-bladder disease is distinctly unusual in the negro, and particularly in the negro male (Maes and McTetridge, Bloch), while our own figures show no very

TABLE II -LOCATION IN COLLECTED CASES

Author	Total number	Head	Pody	Tui	Deffuse
kiefer*	159	9	12	74	33
Kiefert	31	24	,	,	4
Leven	117	82	5	26	24
Authors cases	95	7	s	,	7
Total	415	176	25	41	73
Percentage		66	6	10	1.8

*Collected series

marked racial differences in the incidence of pancreatic malignancy

I inally if chronic pancreatitis were a frequent forerunner of pancreatic malignancy, we should expect to find in most cases a long standing history of dyspepsia. But such a his tory was found in only 19 of the 93 cases in which any adequate history was available, and only 9 cases of gall bladder disease were noted in the entire series (7 with stones and 2 without stones). All the probabilities, there fore, seem to be against chronic pancreatities as a cause of pancreate malignancy.

PATROLOGY

Our data were not sufficiently detailed to permit conclusions as to the histological type of growth (whether duct or gland cell care noma) and the sections themselves were not usually available for study. We have there fore attempted no consideration of micro scopic nathology.

Table II shows the various locations of the malignancy in our series and other reported series and needs no special comment except to emphasize the fact that in 82 cases 8, per cent of the total number the bead was in volved with or without other parts of the gland. The fact that no cases are recorded as involving the body and tail together can probably be accounted for by the rather vague line of demarcation between the two parts of the gland. Other series show to a greater or less degree the same tendency for the malignancy to involve the head of the pancreas.

METASTASES

In considering metastases in carcinoma of the pancreas we have eliminated from the dis

TABLE III —SITF OF METASTASES AND PEGIONAL SPPEAD

Metastates .	Total	Percent	Leven
Total cases	41		90
Liner	20	0.7	590
Regimalnodes	14	34.2	520
Perstaneum	8	195	110
Mesentery and omenture	0	21 9	
Lun s	4	97	110
Pleura	3	30	50
Heart and pencar Joyn	1	1	
Sp een	,	30	110
A frensi glands	3	7.5	110
Gall bladder	3	7.5	
loval ement of gastro-interunal		6:0	

cussion all cases in which autopsy was not done, since the operative indings are neces sarils incomplete on this point. Yo metas tases were reported in 41 of 71 operative cases, which, in view of the unhappy end results seems rather too large a number of localized cases to be accepted without grave misgivings. In the 28 operative cases remaining the liver was by far the most frequent site of the metastasis with the glands about the head of the punctuan next and direct infiltration of the

stomach duodenum, and mesentery last Table III shows the metastases recorded in 41 cases in our series in which autopsy was done as compared with the proportion recorded in Leven's excellent study of oo autopsy cases One or two facts call for brief comment Only 4 cases showed no metas tases The high proportion of cases in which the liver was involved (20), almost twice the proportion of regional lymph node involve ment, leads to the deduction that hepatic involvement must be blood borne deduction be correct, hepatic involvement naturally will occur earlier than lymphatic in volvement, and the performance of radical surgery seems a forlorn hope Lusterman reports that only 52 per cent of the cases handled at the Viayo Clinic showed metas tases the order of frequency heing the liver the regional lymph nodes, the peritoneum, the omentum the polyte organs the mesen ters, and the stomach Both Eusterman and

Leven point out that adjacent abdominal viscera are frequently involved by direct infiltration

The gastro intestinal tract was involved in 24 of the 41 autopsy cases, the metastases in volving the duodenum in 11 cases, the stom ach in 9, the transverse colon in 2, and the descending colon and the small bowel in a each. In one case there were multiple areas of involvement. The frequency of duodenal involvement when the original malignancy involved the head of the pancreas (11 of 32 The lesions which incases) is noteworthy vaded the stomach, on the other hand, were located in all parts of the pancreas Lisions of both stomach and duodenum, as our climical study will show, are likely to cause obstruction or bemorrhage or both

OTHER AUTOPS), FINDINGS

The literature reveals a decided difference of opinion as to the state of the liver in carci noma of the panereas. In our own series 28 of the 4x autopsy cases, 51 per cent, were reported to show a pripable liver on physical examination but the actual autopsy findings reduce the figure to 21, in 18 of which the enlargement was due to metastases clinical and autopsy findings, furthermore, do not correspond Only 16 of the 28 clinical reports were confirmed at autopsy, whereas in 6 cases enlargement of the liver which had not been reported clinically was noted at autopsy. We feel safe in saying that the same percentage of error probably runs through the whole series of 96 cases, in which a clinical enlargement of the liver was reported in 61, 65 per cent We shall have more to say on this subject when the matter of the physical examination is discussed

Ascites was noted in 18 cases which came to autopsy, but was not a usual finding in the operative cases. It was observed in 48 of Leven's autopsy cases, and in 3 of Kiefer's 33 cases. Ascites is a terminal finding and the figures are naturally likely to disagree if autopsy or terminal figures are compared with the figures for operation, which is presumably done in early or relatively early cases. The explanations advanced for the ascites are variously extrahepatic obstruction (4 cases),

intrahepatic obstruction (5 cases), peritoneal seeding (4 cases), and cirrhosis of the liver (7 case), in 4 cases there was no obvious explanation

The mirequency of peritoneal seeding in this disease (4 cases) as compared with its frequency in other intra abdominal malignant conditions is remarkable. This finding is mentioned in only a toperative case, which gives a total of only a cases in the whole 36, and we may accept the figures as correct, for it is unlikely that so striking a finding very often escaped attention at operation. Obstruction of the portal vein by extrinsic pressure from enlarged lymph nodes is a theoretic explanation of the ascites, but Boyce's experimental work on stage obstruction of the portal vein, after which ascites did not occur, seems to invalidate that argument

CLINICAL HISTORY AND SYMPTOMATOLOGY

A discussion of the clinical findings in any disease must properly begin with a discussion of what the late Lord Movnihan first termed "maugural symptoms" We had hoped to be able to find in these carefully analyzed records some syndrome suggestive of the "inaugural symptoms" of carcinoma of the panereas, but we regretfully report that we did not Perhaps this is because the usual routine history is not calculated to bring out the exact character of the patient's earliest complaints Perhaps internes are not as discriminating in the use of words as they might be-though for that matter, neither are the rank and file of the medical profession, regardless of their greater experience Whatever the reason. there was nothing in this group of records to furnish us with the syndrome we had hoped to find

There are in the literature several beautiful descriptions of the symptomatology of careinoma of the pancreas, the only difficulty being that they usually have no application to the case in hand. In addition to these satisfying literary exercises, there is also a group of hard-dying traditions which have been repeatedly shown to be untrue but which persist, nevertheless, in the consciousness of the average physician. It is still rather generally believed, for instance, that carcinoma of the

pancreas frequently causes diabetes though there is no evidence whatsoever to support this belief All diseases of the pancreas, again, are hy convention associated with girdle pain. though this symptom is almost never noted in carcinoma of the pancreas Such intestinal disturbances as constipation or diarrhea are usually considered to be present in carcinoma of the pancreas, but if they are, most patients fail to observe them If frothy or fatty stools are a feature, as many physicians believe, again patients fail to observe them and we must look to the laboratory for proof of their presence What is more, it must be a better laboratory than the average general hospital boasts, if we are to believe the evidence of our own records and the casual mention of stool changes reported by observers who have really observed their cases carefully

In short, many descriptions of carcinoma of the pancreas which abound in the literature seem to be based on impressions rather than facts and are not usually supported by a critical study of a representative number of cases. We ourselves feel that reliance on the so called classic picture of the disease can lead only to disaster, and we agree with Eusterman that a combination of symptoms, and a widely various combination at that, is far more in accord with the true facts Furthermore, if symptoms are not evident enough early enough, or are not definite early enough, for a correct diagnosis to be made, it is almost useless to discuss the matter except for such intellectual satisfaction as the investigator may derive from his effort. Such discussions do not henefit the patient Delayed diag nosis always means delayed treatment, and delayed treatment in carcinoma of the pancreas seals the patient a doom

DURATION OF SYMPTOMS BEFORE HOSPITALIZATION

Basing our statistics on the 93 records in the histories were sufficiently full for analysis, we find an average duration of symptoms before admission of 48 months, which agrees closely with Kiefer's estimate of 43 months. If we eliminate 5 cases with a history of symptoms for 2 years, the average duration in our series is practically the same for the

various locations of the malignancy (5 months for the head, 42 months for the body, 3 months for the tail, and 5 6 months for diffuse lesions) Our suspicion concerning these un usually prolonged histories is that the symp toms of some other abdominal disease, such as chronic cholecystitis, merged impercepti bly into the symptoms of carcinoma of the pancreas The average duration of life after the onset of symptoms is given by Mavo-Robson (quoted by Leven), Heiherg (quoted hy Jeven), Leven himself and Friedenwald and Cullen as hetween 5 and 8 months, which makes it illogical to accept absolutely a 2 year duration of symptoms before treatment. Even if these cases be included, however, there is still no significant difference in the duration of symptoms before treatment for the different locations of the malignance. The shortest duration was in a case of carcinoma of the head of the gland (1 week), and so also was

the longest duration (2 years) We had thought that since jaundice is a frequent early symptom of carcinoma of the head of the pancreas, patients so affected might apply for treatment earlier than those with less striking symptoms but the figures do not justify this surmise. There was no cor relation, furthermore, between the duration of symptoms and the extent of the growth One patient with diffuse involvement of the gland and extensive metastases bad heen ill only 2 weeks Others with smaller, localized lesions told a much longer story. It was discouraging, too, to note at autopsy how many patients with mild symptoms of sbort dura tion had lesions which could not possibly have heen extirpated At that, however, autopsy revealed a small number of cases, some 8 in all, in which all gross evidence of the disease might have been removed by surgery, from which we may conclude that in a certain per centage of cases of pancreatic carcinoma there is at least a theoretic possibility of successful operatioo

STARTOMATOLOGI

The only syndrome that is widely diagnostic of carcinoma of the pancreas is the classical syndrome of Bard and Pic which is supported by Courvoisier's law and which includes cachevia, jaundice, and distention of

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TABLE IV -4NALYSIS OF SYMPTOMS IN RELATION TO IAUNDICF

	With jaundice				Without jaundice						
	Head	Body	Tail	Diffuse	Sub total	Head	Rody	Tail	Diffuse	Sub total	Total
Total	66		z	3	72	0	5	6	t	21	23
Pain	43		1	5	54	7	1	6	1	18	72
Dyspepsia present Qualitative	33			3	36	4	3	1		8	44
Quantitative	,		1	2	12		1	,		,	14
Dyspepsia in past Qualitative	12			,	14		1			1	15
Quantitative					4.						4
No weight loss	5		1.		5	1		5		1	6
not stated	24		1	3	28	5	2	1	1	9	37
amount not stated	7	1		1	7	[1		1	8
under 20 pound	5			2	7	ī				1	8
over 20 pounds	25				25	3	3	3		0	34
Nausea and vomiting	31			3	34	5	3_	1	1	10	44
Constipation	27			2	24	6	1	2	T.	11	35
Diarrhea	4			1	5	r	1			,	7

the gall bladder associated with a liver of normal size This syndrome, however, concerns only the head of the pancreas and does not necessarily appear in toto in any case in that Any impartial study, therefore, must begin without preconceived notions as to special syndromes, or the infrequency of any special symptom or group of symptoms. Our own pictures prove that point very clearly Most of the patients with earcinoma of the head of the pancreas did not have a palpable gall bladder, only 88 per cent had jaundice, and the liver findings showed a very high percentage of clinical error, an enlarged gall bladder frequently being mistaken for an enlarged liver and so invalidating the clinical picture The most important symptoms of carcinoma of the pancreas in the series which we studied are jaundice (77 4 per cent), pain (77 4 per cent), dyspepsia (62 4 per cent), loss of weight (53 7 per cent), and nausea and vomiting (47.3)

RIVES, ROMANO, SANDIFER

Constipation and diarrhea, which were noted respectively in a third and a fifth of the cases, are no more frequent here, we suspect, than they are in presumably normal individuals of the same age group Diarrhea was less common than in chronic biliary disease and probably has no value as a diagnostic sign Prurits, which we had expected

to be a common complaint in the 72 cases of jaundice, was noted in only 3 cases

Pain The general belief that carcinoma of the panereas, especially when it is associated with jaundice, is a painless condition was not borne out by our figures nor is it borne out by observers clsewhere Leven notes pain in 100 per cent of his cases, Mussey in 88 per cent, Friedenwald and Cullen in 83 per cent, Futcher in 58 per cent, and Kiefer in 64 per cent.

Pain occurred in 72 of the 93 cases suitable for study, 77 4 per cent (Table IV), and was relatively more frequent without jaundice (18 of 21 cases, 86 per cent) than it was with jaundice (54 of 72 cases, 75 per cent) It was present in 5 of 6 diffuse lesions, in 4 of 5 eases limited to the body, and in all cases (7) limited to the tail of the gland On the other hand, of the 75 cases involving the head only 55 (73 3 per cent) were associated with pain on admission This absence of pain in 20 cases of the latter group cannot be entirely due to the fact that jaundice brought the patients to the hospital before pain developed, for 2 of the o prtients without jaundice in whom the discase was limited to the head of the gland did not eomplain of pain on admission. We can only conclude that lesions involving this special area cause pain less frequently than do those

TABLE V -ANALYSIS OF PAIN

Location	Total	Con tant	Colic like	Constant later colic hke	Inter mattent non-colc like	\ot describe i
Head	75	27	6		6	14
Body	5	7	r		1	
Tail	7	7				
Diffuse	6	5		-		
Total	93	41	7	,	7	¥5
Percentage	1	45.0	2.5	10	25	

involving other parts of the gland. As an imtial symptom the pain in itself was seldom severe enough to lorce the patient to seek

medical advice While no detinite conclusions could be drawn from our study of the radiation and location of the pain some facts are very sug gestive Of 46 patients with pain in the upper abdomen to 41 per cent complained of radia tion to the side or the back. Many authors state that in carcinoms of the body of the gland the pain characteristically radiates to the back or the scapula but of our 17 cases involving this area, with or without involve ment of other areas, only 6, 35 per cent, showed radiation which is practically the same as the incidence of radiation in other areas In 5 cases in the tail associated with pain radiation is mentioned only once, and in this case, curiously there was no pain on the left side Of 3 very extensive lesions only 1 caused radiating pain while of 31 cases localized in the head of the gland, 12, 35 per cent, were associated with radiating pain, in I such case the pain was limited to the back Obviously, the location of the lesion has little. if anything, to do with the radiation of the pain

Distention of the gall bladder has been ad vanced to explain the pain of carcinoma of the paincrias, but we think that the explaination does not hold. The generally dull character of the pain is entirely against that thesis, and the type, we might interpolate at this point also helps to differentiate carnoma of the paincreas from such acute upper abdominal conditions as gall hladder disease.

Of 60 patients in this series with distended gall bladders, 44, 70 9 per cent, complained of

TABLE VI -- INAUGURAL SYMPTOMS

	_						
	Head	Head and body	Body	Tail	Di	Total	Per cent
\umber cases	6r	14	5	9	7	96	
Pain	34	8	4	7	5	55	603
Jaund ce	11	5	_	1	•	10	19.8
Synchronous pain and jaundice	5					8	8.4
Dyspeycia anorexia weight foss		,	1	:		,	73
Abdaminal mass	1_4					4	4,

pain while of at patients without distended gall hladders, 28 903 per cent complained of it To express it differently, while the gall bladder was distended in 61 per cent (44 of 71) of the patients with pain, it was also distended in 76 per cent (16 of 21) of the patients with out pain. This seems almost conclusive evidence that in most cases the pain does not originate in the gall bladder. The lower frequency of pain in patients with distended gall bladders (61 per cent against 76 per cent) is probably due to the fact that the disease in most of these cases was limited to the bead of the gland, in which area, as we bave already shown, pain is by no means as frequent as it is in other locations

Our own theory is that the pain is probably due to direct infiltration and distention of the pancreas; with blocking, of the pancreas; with blocking, of the pancreas; of Chauffard and others that it is due to pressure of the malignant mass on the celac pletus. Severe pain is probably due to infiltration of adjacent viscera or hemorrhage into the gland with pancreatitis, as was observed in taxe submitted to autops; The fact that 5 of the 4r patients submitted to autops, due to complain of pain is worth comment 4 of the 5 had no metastases, while in the fifth case only the regional lymph nodes and the liver were involved.

To consider pain as an mangural symptom (Tables V, VI), some discussion of its association with jaundice is also necessary. Pain was the first symptom in 58 of our cases, 60 3 per cent, and was by far the most general first symptom, jaundice was next, being complained of first in 19 cases, 108 per cent

Eight other patients, 8 4 per cent, developed pain and jaundice simultaneously, and 18 noted the jaundice within a month after the onset of the pain. We feel quite sure that some of this latter group actually developed pain and jaundice at the same time and simply overlooked the joundice We feel it fair, therefore, to combine the figures (10 with jaundice first, 8 with pain and jaundice simultaneously, and 18 with jaundice shortly after the development of the pain), and to say that 45 persons had jaundice with or without pain as one of the first symptoms of their illness We are supported in this apparent juggling with figures hy the fact that while 72 patients revealed a jaundice on physical examination after they had been admitted to the hospital, only 52 of them knew that it was present We frequently note such ignorance of obvious facts in Charity Hospital, where the color of negro patients obscures such physical findings and where frequently a comparatively low level of intelligence and education introduces other difficulties

With or without jaundice, however, there is no doubt, from our own analysis, that pain is the most common first symptom of carcinoma of the pancreas. Futcher notes that it is usually the earliest and most persistent of the various symptoms, but does not comment on its frequency. Kiefer reports it as first in only 4 (13 per cent) of his 33 cases, and other writers ignore this special point.

Jaundice This finding, as we have already noted, was present in 72 of our 96 cases, 77 per cent It was present in 71 of the 82 cases involving the head of the gland, 87 per cent, though only 58 of these patients, 81 7 per cent, had distended gall hladders, which places the 13 others among the exceptions to Courvoisier's law that the gall hladder is distended in malignant disease. It is possible, however, to explain 8 of the 13 cases in which the gall bladder was not distended. In a case only the tail of the pancreas was involved and the jaundice was due to inflammatory changes in the gall hladder and hile duct The 7 other cases involving the head of the pancreas included 2 cases of non-calculous cholecystitis, 4 cases of cholelithiasis, and 1 case of metastasis to the gall hladder. A rather confusing fact, that of a total of 7 cases associated with cholelithiasis 4 showed grossly distended gall hladders, is prohably to be explained by the frequent finding of stones in gall hladders which are not grossly diseased and consequently are capable of distention

Leven reported jaundice in 77 per cent of his 32 cases, Kiefer in 76 per cent of his 33, Futcher in 74 per cent of his 31, Friedenwald and Cullen in 78 per cent of their 37, Mussey in 41 per cent of his 90, and Eusterman in 46

per cent of his 48

Dyspepsia Fifty-eight patients, 62 per cent, complained of dyspepsia as part of their symptomatology on admission The fact that in most cases (44) this was of the qualitative type (Table IV) is to be expected, since either jaundice or pancreatic dysfunction is usually accompanied by this variety Sixty-seven per cent (48) of the patients with jaundice complained of dyspepsia, in 36 cases of the qualitative type, and 48 per cent (10) of the patients without jaundice complained of it, in 8 cases of the qualitative type. In other words, qualitative dyspepsia predominates in about the same proportion, whether or not biliary obstruction exists. The surprising fact is that all patients with carcinoma of the pancreas do not complain of it

Loss of weight In 37 cases in this series the matter of weight loss was not noted and it is probably reasonable to assume that this finding was not marked in any of them. In 56 cases some definite statement was made. In 6 cases it was definitely stated that there was no weight loss. In the 50 other cases loss of weight is specifically reported as a symptom Futcher reported a marked loss in 29 of 31 cases, Kiefer in 28 of 33, Coller and Winfield in 27 of 30, and Leven in all of his 32 cases.

The loss in pounds is always considerable. In 8 of our cases the amount was not stated, but in 8 cases it was less than 20 pounds and m 34 it was more than that amount. Kiefer reports an average loss of 28 pounds, Futcher of 32, Mussey of 26, Eusterman of 29, and Keeton losses up to 80 pounds.

It had seemed to us that the anorexia and intestinal indigestion associated with jaundice might be a major factor in the loss of weight, but the facts do not hear it out. Thirty-nine

(54 per cent) of the jaundiced patients reported a loss of weight, but 11 (52 per cent) of the patients without jaundice exhibited the same symptom As the percentage could he scarcely more nearly the same, our hypothesis must be ahandoned Furthermore. only 35 per cent of the jaundiced patients had lost 20 pounds or more, against 42 per cent of the non jaundiced patients with this weight loss. It might be suspected from the literature that failure of the extrinsic secre tion of the pancreas to reach the intestinal tract because of obstruction of the duct of Wirsung might be a major factor in the loss of weight, but since jaundiced patients are the ones most likely to exhibit such an obstruction, our figures are against that hipothesis also

Nauses and vomiting The incidence of nausea and vomiting in other reported series ranges from the 32 per cent reported by Futcher to the 80 per cent reported by Friedenwald and Cullen It was present in 44 of our cases, 47 3 per cent We had considered that its frequency might be due to biliary ob struction, but the records show that 47 per cent of the patients with jaundice (34 of 72) complained of this symptom against 48 per cent (10 of 21) without jaundice. We must look elsewhere therefore, for the cause A reasonable explanation seems to he in direct involvement of the gastro intestinal tract or direct involvement of the pancreas itself. Of the 44 patients who complained of this symptom 15 showed either direct involvement of the stomach duodenum, and jejunum, or partial obstruction of these structures by extrinsic pressure. On the other hand, since 53 per cent (34) of the patients with biliars obstruction had no nausea, and since 66 per cent (20) of those who complained of nausea had no invasion or obstruction of the intes tinal tract neither jaundice nor gastro intestinal involvement offers a reasonable explanation for this symptom, and the im portant cause is probably direct involvement of the pancreas itself

Hemorrhage In view of the high incidence of jaundice in this series it seemed reasonable to expect that hemorrhages of various sorts would be quite frequent Actually, however,

only 5 jaundiced patients ethibited bleeding as a symptom, in one of this group the hemorrhage was due to invasion of the gastro intestnal tract. Only 4 jaundiced patients, further more, died of postoperative hemorrhage Even if we add to these 9 jaundiced patients, 4 non jaundiced patients whose hleeding was due to invasion of the gastro intestinal tract, the total figures for hemorrhage are by no means impressive

The infrequency of hemorrhage in carcinoma of the pancreas in joundiced patients parallels the finding of Boyce, Veal, and McFetridge in their analysis of the causes of death after hilary surgery in Charity Hospital They have no explanation to offer for so straining a variation from the usual figures for hemorrhage in jaundiced patients with cholecystic disease, but it seems a curious coincidence that in our own series dealing with jaundice of a different origin very much the same situation should prevail

PHYSICAL EXAMINATION

With the exception of diseases of the female pelvis, phiscal examination is usually unreliable in the diagnosis of neoplastic diseases within the addoment, and carcinoma of the pancreas is no exception. On the other hand, in a considerable number of cases such an examination does give definite evidence of serious upper abdominal disease, as we shall point out shortly, and when analyzed in connection with the clinical history, it should lead to the appropriate laboratory in vestigations and should turn one's mind to exploratory operation if such tests do not clear up the saturation.

Friedenwald and Cullen noted abdominal masses, excluding palpahle gall bladders in 16 of their 37 cases Kiefer in 0 of 33 and Futcher in 12 of 21. The primary tumor is probably rarely felt, and metastatic masses in the liver and other viscera, together with the dilated gall bladder, make up the tumorusually felt. Table VII shows the classification of the abdominal masses recorded in our own series. They were palpated in 51 of the 96 cases but operative and autopsy evidence primes that in a large proportion of cases prohably the majority, the supposed tumor

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mass was not the malignant tumor but the

liver or the enlarged gall bladder

Twenty-eight of the 41 cases which came to autopsy, 51 per cent, exhibited clinically, as we have already pointed out, a palpable liver, but the autopsy findings reduce the figure to 21 per cent Turthermore, only 16 of the 28 clinical reports were confirmed at autopsy, whereas in 6 cases enlargement of the liver was noted at autopsy which had not been reported clinically These errors are so significant that we believe the repetition of these facts is warranted at this point Coller and Winfield report the liver palpable in twothirds of their cases, Leven reports it palpable in 81 per cent, and Kiefer, Futcher, and Friedenwald and Cullen report percentages varying from 57 to 80 per cent. None of these authors, however, states in how many cases the clinical finding was confirmed by operation or autonsy

The errors noted in palpation of the liver seem to have been perpetrated also in the examination of the gall bladder. Only 27 palpable gall bladders were reported in the records, against 60 grossly distended organs found at operation or autopsy. In a few cases the distention was not marked and the gall bladder perhaps really could not be palpated, but this does not hold true in most cases, as is proved by the repeated use of such words as "enormous" and "tremendous".

Physical examinations recorded in other senes seem to be considerably more accurate Leven reports palpable gall bladders in 14 of 20 Jaundiced cases, all confirmed by operation or autopsy. Kiefer was able to palpate 15 of 17 distended gall bladders, and Friedenwald and Cullen 23 of 37 Mussey found palpable organs in 31 of 37 Jaundiced patients, and Eusterman mentions 50 per cent palpable in his series.

Tenderness was noted in 51 of our cases, 548 per cent, but was without very striking characteristics. The location usually corresponded with the location of the pain. Ranson mentions tenderness in "most" of his cases, Friedenwald and Cullen in 70 per cent, and Leven in 66 per cent.

Jaundice bas been sufficiently discussed elsewhere to need no repetition, and we have

TABLE VII -PHYSICAL FINDINGS

	Head	Head and body	Body	Tail	Dif fuse	Total
Total cases	6;	14	5	7	6	93
Jaundice	5.3	11		2	6	72
Enlarged liver	44	7	1	4	5	6r
Tumor	31	10	2	6	2	51
Tenderness	33	7	3	3	5	51
Palpable gail bladder	20	6			1	27
Ascites	8	T	2		1	1.3
Edem3	7		T			3

also mentioned ascites as being an infrequent and terminal state. A slow pulse is very generally regarded as characteristic of jaundice, but we did not find a single instance of brachycardia among our 72 jaundiced patients.

Considering these various findings from the standpoint of diagnosis, it may be said that the patients with palpable tumors and the patients whose first symptoms were loss of weight, anorevia, and dyspepsia, probably were all at the stage where nothing could be done to help them Their disease was far advanced before they had reason to suspect its existence, and Gordon-Taylor's unique report of an 8 year cure in such a case does not alter the hopelessness of the general picture

From the standpoint of the physician such patients appear with their diagnosis already made The patients with pain and jaundice would be suspected of having some serious pathological state in the biliary tract and pancreas, as would the patients who present jaundice as their first symptom. In the hands of a competent practitioner they would be subjected to prompt exploration, on suspicion if no definite diagnosis could be made reasonable number of such patients, we may assume, would have localized lesions, perhaps suitable for extirpation by the method of Whipple, Parsons, and Mullins The patients with the single complaint of pain form a more perplexing group In such cases the discomfort is seldom very severe and has no special characteristics pointing to its origin, though perhaps more careful questioning might shed a good deal of light on the matter We have promised ourselves to be considerably more careful in this regard in the future

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LABORATOR'S STUDIES

The resources of the laboratory were per haps not as fully utilized in this series as they should have heen, which leads to the natural suspicion that the true character of the lesion was frequently not suppected Pancreatic function tests, in particular, were not used often enough to permit us to draw any conclusions at all concerning their value Perhaps they were so hittle employed because the reports in the literature offer so hittle hope from them.

from them Stool examinations were fairly frequent, but the results, except for the absence of bile in jaundiced patients, were uniformly negative The bulky, fermenting, and putrefying stools repeatedly mentioned as characteristic of carcinoma of the pancreas were not found, nor was a high fatty content noted in any case in which such a study was made. Friedenwald and Cullen, Kiefer, and Futcher report such andings as the exception rather than the rule, and we believe that both of these supposed facts are entirely supposititious. We are supported in our belief that stools of a high fatty content are not characteristic of carcinoma of the pancreas by the recent report of Whipple, Parsons and Mullins, dealing with the ability of the small intestine to take over the digestive function of the pancreas after resection of the gland We are further supported by the (unpublished) data of F F Boyce on the subject of fat digestion after ligation of both pancreatic ducts and large resections of the pancreas. Even with diets far above the average in fat content he could not produce fatty stools

The urne showd little worthy of comment Jaundiced patients showed the usual finding of hile, hut gly cosuria was noted in only 2 patients hoth with elevated blood sugars, one of whom had a history strongly suggestive of an antecedent dishetes. Gly coming is not a typical finding in carcinoma of the pancreas. Pearce and Eusterman found it in only as small number of their cases, less than 10 per cent. Friedenwald and Cullen noted it in only 16 per cent, Kiefer found it in only 43 of 251 collected cases, and Leven found it in only 30 of 32 patients, 2 of the 3 having a previous history of dishetes.

Nine patients, including the 2 patients previously mentioned as having glycosurae exhibited a blood sugar above 120 milligrams. In only 2 cases, however, was the tail of the gland involved, and it seems fair to say that the relation of the elevated blood sugar to the neoplasm is very questionable Certainly the obstinate fiction that carcanoma of the pan creas frequently causes dishetes is not supported by our figures, nor has it ever heen supported by substantial evidence or informed opinion

Eighteen of 49 patients examined (36 per cent) ethibited a leucocytosis, and it is worth of note in this connection that fever was equally common. It is important to remem her, therefore, that when the diagnosis lies between inflammatory, and neoplastic disease of the pancreas, the presence of neither fever nor leucocytosis can be depended upon to eliminate malignancy.

The reteric index, gastric analysis, and blood studies offered no information pointing to the diagnosis of carcinoma of the pancreas. On the other hand, the information supplied by the τ ray, which was used in 50 cases, was frankly very surprising to us. Because of the differences in the manner of approach to the problem, these 50 cases must be considered in 2 groups.

Forty cases were studied by Dr Amedee Granger and his associates at Chanty Hos pital This group attaches great importance to the evidence of extransic pressure on the gastro intestinal tract, and even more importance to the widening of the duodenal loop On this basis they made a correct diagnosis in 17 cases, 40 per cent of the total number studied, though naturally we have no way of knowing in bow many other cases the diagnosis was made moorrectly, on the basis of the same finding In spite of this possibility, bowever, we are decidedly impressed with their frequency of fourcet diagnosis.

Drs Henderson and Rodick, who studied to cases at Touro Infirmary, concentrate their attention on extrinsic pressure and actual narrowing of the lumen of the stomach and duodenum, without attempting to identify the cause of the deformities noted On this basis they noted partial obstruction of

the duodenum in 4 cases (3 in the second portion and 1 not strited), and extrinsic pressure in 2 (1 on the duodenal bulb and 1 on the pylorus) Sixty per cent of their cases, thereiore, showed definite evidence of organic discase in the region of the body and head of the panciess

Turning to the literature, we find Speed reporting only 2 positive v-ray diagnoses in 23 cases. Leven 6 in 24, and Kiefer none in 13 cases. On the other hand, we have in 50 cases in our series positive or definitely suggestive indings in 23, 48 per cent. Certainly no other method of diagnosis seems to offer so much promise, and the percentage of correct diagnoses will probably be materially improved as the method begins to be more widely used

THERAPY

The results of treatment by the methods employed in this series form a melancholy pic ture, and the poor results are substantiated by statistics from most other clinics. Twenty-five of our 71 surgical patients died in the bospital and are promptly climinated from the discussion. Of the 46 remaining, we have been able to secure a follow-up note on only 20, all of whom were dead at the end of 8 months, and 30 per cent of whom were dead within 3 months. Furthermore, while our information is too slight for definite statements, we may say that we were not impressed in any case with any very marked relief of symptoms after surgical treatment.

In view of this picture, only two factors would seem to make it worth while to carry the procedure beyond simple exploration, which, in itself, results in a definite mortality, though it is the only course open in many cases to make the diagnosis at all The first reason for operation, other than exploration, is that the diagnosis may be erroneous and that biliary obstruction, which dominates the picture, may be due to some benign lesion such as pancreatitis, stricture of the duct, or unrecognized stone in the common duct The second reason is that the relief of jaundice by anastomosis of the gall bladder to some part of the intestinal tract may produce some transient clinical improvement in the symptoms due to jaundice On the other hand, judging by our own statistics, jaundice seems to play so small a part in the incidence and severity of the various symptoms that we should expect little benefit from such a procedure

Radical resection of the pancreas for cancer has not often been attempted, because of the serious technical and anatomical difficulties involved. Whipple and his associates seem to have solved the problem of radical resection of the bead of the gland, and although the operation they propose is a very formidable one, it seems fully justified by the mevitably rapid and fatal course of the disease when it is untreated.

The tail of the gland has been removed many times for benign lesions, and the techmoue is well described by Clute in a discussion of carcinoma of the pancreas. We cannot agree with him, however, that this procedure is adequate for malignant disease. It does not include regional removal of the lymphatics extending from the tail of the pancreas along both the upper and lower borders of the gland and beneath it into the hilum of the spleen, from which point they lead to the gastrocolic omentum and follow the gastroepiploic vessels toward the pylorus We have seen at autopsy definite metastases along this lymphatic chain for this reason we insist that any operation for cancer in the tail of the gland must include the following steps removal of the spleen with its vessels as far as the resection of the panercas is to extend. removal of the splenic ligaments as close to the stomach as possible, removal of the entire gastrocolic omentum, including the gastroepiploic vessels. By such a procedure the lymphatic trunks which lead from the tail of the pancreas to the spleen are removed, as well as those which follow the gland itself toward the pancreaticoduodenal and aortic lymph nodes

It remains to mention in conclusion the operation described by Gordon-Taylor and performed by him in a single case, which resulted in a spectacular cure, lasting 8 years when he made his report. Whether it could be duplicated is another question the author himself notes that it required a combination of extreme daring and unusual good luck. The malignancy in this case involved the body.

PACKING GAUZE DRAINAGE AFTER PNEUMONECTOMY

Dr JOSÉ ARCE, Buenos Aires Argentina

URING recent years, my experience in lung surgery has increased con siderably Some time ago opening the pleura was a rather exceptional procedure, and approach to the lung was only a step in the process of the eradication of hydatid cysts Now, however, we olten have the opportunity of exploring the lung in cases ol bronchiectasis cancer, and loreign bodies If hydatid cysts are eliminated we find that cancer is the next most frequent condition that calls for surgical treatment More than a dozen times I have had to deal with this serious condition. In some of the cases I have simply explored the region without further attempt at removal, hecause the cancerous lesion was so extensive that it was inoperable In other cases I have performed a total pneumonectomy, but without success as my pa tients died within 21 hours to 8 days after operation Both my assistants, Drs Ivanis sevich and Ferrari, have performed total pneumonectoms for cancer, but they too have had untoward results Such failures may be explained by the facts that the patients were in very had condition as a result of the advanced stage of the disease, that they came for treatment late that the operation itself may cause respiratory and circulatory dis tress, and also it should be kept in mind that infection easily establishes itself in the pleural cavity

Fortunately, our results bay e improved during the past year. I have had the opportunity of saving the lives of two patients one, a box of 12, and the other, a woman of 29 years, were subjected to total pneumonectomy of the right and the left lung, respectively

In these operations I did not follow the general technical procedure, and I shall at tempt here to present a brief description of my method

In the first case pneumonectomy was per formed for the treatment of congenital bron

From the Department of Sur ery University of Buenos Ages

chiectasis with several cavities present in the right upper and middle pulmonary lohes When first admitted to the bospital, the how had an abscess of the upper right lobe as a result of the infection arising from one of these cavities One of my assistants Dr Ivania sevich, in charge of my service at that time, opened and drained the abscess, and in 2 months, the wound was healed examination, bowever, revealed that the cavities still persisted and that there was free communication with the bronchi-possibly a recurrence of the infection with all its seque It was quite logical to consider, without further intervention, that some other disease. such as tuberculosis or amyloid degeneration, might he developing I therefore advised per forming a pneumonectomy at once operation was difficult only when I severed the adhesions present between the upper lohe and the chest wall, in the field of the former operation. I noticed that it was bleeding severely here, and it was impossible to con trol the hemorrhage except by packing

I decided to pack the entire cavity with titled in the pedicle would not ship as sometimes happens and to prevent the formation of a fistula that sometimes is seen in such cases. The packing fitted the thoracic cavity tightly and I covered the stump left at the pedicle with oddorm gauze

By means old 6 big compresses I was able to control the hemorrhage Another large com press placed between the others over the lung stump, compressed the mediastinum

The after result was excellent, 2 days after operation, the boy was normal, and 15 days later I removed the 7 compresses used for packing I was amazed to discover a funnel his cavity, dean, uniform even covered with very bealthy looking granulation tissue. The costodiaphragmatic sinus, filled with the granulating itssue, had already disappeared, so that the stump was entirely covered and it was impossible to see the silk ligature which

I had left in the pedicle The wound was in excellent condition and healed quickly and

completely

A complete report of this case with illustrations will soon be published in another journal. The success obtained encouraged me again to use the "packing drainage" in other cases

Last September, I operated upon a woman who had a metastatic carcinoma of the lung after the removal 6 months previously of a nevus carcinoma of the face. The operation was performed without difficulty and after the extrpation of the left lung, in the upper lobe of which near the hilus the tumor was located, I inserted into the empty left thoracic cavity a packing similar to that described, consisting of 6 compresses. I left free only the pedicle over which I placed very tightly a large compress of iodoform gauze. Lach of the compresses measured about 1 square meter in surface.

The postoperative course was uneventful, the day after operation the patient appeared like one who had had an appendicectomy, convalescence was without mendent. Fifteen days after operation, the compresses were removed, and the operative wound was found to be in good condition. In the anterior part of the earity, the beating of the heart was apparent through the pericardium and the layer of granulating tissue that covered it. Three weeks after operation the wound was greatly reduced in size, and the patient, who had been getting out of bed, was feeling time.

Can we say that the packing was helpful in brining about recovery in these 2 cases after total pneumonectomy? I believe that it did have considerable influence in bringing about the lavorable outcome and the good condition of the patient immediately after operation. The open wound, well packed, held in check any pleural infection, and there was no further possible reabsorption of total material. These two advantages insure a good chance of recovery.

How can we explain the influence the packing drainage had upon the favorable results?

The packing drainage filled the hemithoracic cavity, just as a Mikulica's drain fills the pelvis, thus preventing the retention of hquids that may become more or less septic and cause pleural infection Gauze packing is much better than rubber tube dramage.

2 Packing dramage in itself acts as a support to the mediastinal organs, thus prevent ing displacement and insuring good function of the remaining lung Normally, there is a balance between the two halves of the thorax. because both are filled. If we take out one of the lungs, however, and we leave the thoracic cavity empty, we create a sudden pneumo thorax, just as is present in case of injury or the surgical opening of the thorax The mediastinum is then displaced all the way to the opposite side during the inspiration and toward the diseased side during expiration This displacement interferes with inspiration as well as with expiration. This clocs not happen with closed pneumothors, because the positive pressure produced by the air injection into the pleura prevents the displacement of the mediastinum as in the case of an artificial pneumothorax and also of the preliminary pneumothorax that I was the first to introduce into the practice of thoracic surgery

After pneumonectomy if the thorner cavity is left empty, the physiological and pathological conditions of open pneumothorax are quickly established, but if the cavity is filled tightly with a gauze packing, we prevent displacement of the mediastinum and the remaining lung will have normal support for its function. The heart will work much better and the equilibrium of function will be soon established.

3 After pneumonectomy, healing begins in the stump, and the healing tends to obliterate the blood vessels and the sewered bronch. The pulmonary artery and veins are ligated very close to the heart, and it may be possible that the clots that develop back of the ligature may advance toward the cavities of the heart and produce some very dangerous form of thrombosis Perhaps by keeping the organs in place, the packing drainage helps to prevent

favors the quick complete obliteration of the ligated vessels

The success that I have had in these 2 cases of pneumonectory may have led me to explain the results on a mere hypothetical basis, and there may be some other more

any possible displacement of the clot and

accurate explanation of the facts I believe. however, that at least the first two items in my conclusions are borne out by the facts No matter what the explanation may be. the results speak for themselves and are more

important than theories. If my colleagues accept my theories, I will have still further reason to continue the use of packing drainage after pneumonectomy in order to help patients after the removal of a diseased lung

FURTHER STUDY OF BLOOD IODINE CHANGES IN AFFECTIONS OF THE GALL BLADDER

JOSEPH L DECOURCY, M D, FACS, Cincinnati, Ohio

THE importance of being able to estimate the amount of jodine in the blood, both in normal and patholog ical conditions is now well recog nized For the past 1, years efforts have been made to establish standards of technique whereby such estimations could be made quickly, easily, and accurately

Progress bas been made but much still re mains to be accomplished. We are non able, however to make these estimations with suf ficient exactness to be of great value in climical practice. Used at first only in thyroid diseases, the test for blood todine has shown its usefulness in the diagnosis of numerous other conditions (Perkin Lahes and Cattell)

At the writer's clinic the test was made originally upon gotter patients only More recently its application has been extended so as to become a part of the routine general examination. Our attention to this wider use fulness of the test was attracted when we set out to arrive at a normal standard of blood iodine for the geographical region within one hundred miles of Cincinnati In this en deavor we made some two hundred deter minations upon residents in this area coming under our care These were patients suffering from a wide variety of affections many in no way connected with thyroid derangement Among them were some cases of acute cholecystitis and also of chronic cholecystitis and liver deficiency

In a previous report (3) of blood iodine studies in cholecystic disease, I concluded that such determinations might be a better test of

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hver function in cholecystitis of long stand ing than the dye tests in general use, es pecially since rodine is a normal constituent of blood With the knowledge afforded by such a test many cases of "liver death" could be avoided by administering glucose before operation to gall bladder patients showing high blood toding values

The present communication is an am philication of these earlier studies. It was noted that a high iodine content of the blood was my arrable in the acute cholecy stitis cases. much above the 3 to 6 gamma per 100 cubic centimeters which our researches and tests had shown to be normal for our section of the country In chronic cholecy states with stones, an average of 20 cases proved to be 166 in the chronic condition with stone in the common duct it was 2000. Tour cases of bydrops of the gall bladder gave an average of 136, while carcinoma of the liver showed 650 for 3 cases These results pointed strongly to the liver as a potent factor in the regulation of blood todine

Further researches together with a large number of clinical observations, served to con firm this opinion. In obstructive saundice the blood rodine was regularly very high. In cholect stitis and hepatitis also the figures rose far above normal. But the blood jodine re mained normal in cases of advanced cirrhosis of the liver a finding which we were at a loss to correlate with any of the other data which we obtained The relationship between the liver and the thyroid gland-source of the body's todine supply-is being widely in vestigated (Repetto, Doetsch)

These observations are of especial importance in connection with the factors of safety in preparing for operation upon the biliary system. In the past few years we have heard a great deal about "liver deaths." Indeed, a considerable literature upon this subject has been collected.

In reviewing this literature recently (1935) Boyce and McFetridge remark that they were particularly impressed with the occurrence of the hepatorenal syndrome in cases of disease of the thyroid They cite Weller who, in 44 autopsies upon hyperthyroid cases, found marked hepatitis in 22 and moderate hepatitis in 16, the liver being normal in but 6 subjects But in a series of control cases, these being subjects who had died from causes other than those involving the thyroid. Weller noted precisely opposite conditions. In 30 cases there was no liver abnormality, in 13, slight hepatic involvement, and there was but a single case in which the liver was extensively involved.

Rowe found the incidence of hepatic complication to be far more frequent with thy roid disease than with any other endocrinopathy. "The objective measures of vital function level such as the blood and urine pictures, respiratory metabolism, and the like," he said, "all exhibit the twofold influence operating in the individual case."

This investigator believes that the thyroid produces aberrations of the respiratory metabolism, while the liver affects the carbohydrate utilization. He sums up his position by saying "The possibility of hepatic dysfunction with its influence on certain vital function levels in patients with a normal gastro intestinal history should be borne in mind Further, liver disorders may complicate other disease states and functional derangements and thus produce both symptoms and objective measurements not suggestive of the primary condition A frequent association, for whatever cause, between thyroid failure and hepatic dysfunction would seem to be established "

EXPERIMENTAL DATA

Because of the interest aroused by our own observations and the reports, both laboratory

TABLE I -- UNOPERATED UPON CONTROL-

		KALLI	*	
Day	Food todine (gammas)	Fecal sodine (gammas)	Urinary iodine (gammas)	Blord todine (gammas per 100 c cm)
1	II 4			
2	0			4.4
3	3 7			
4	13 6		3 8	
s	68	6 3		
6	6.8		3 4	
7	7.4			
8*	7.4			
-0	7.4			
10	6 2			
57	69			
13*	7 4			
13	3 4			
14*	0.4		40	
15	9 1			
16	60			
17	91			
18	10 8			
10,	12 5		11	
20	221			
21	225			
22	272			16 S
23*	15 6			14 5
74	17 9			27 5
12	14 6			
25	ES 4			
7*				8 5
28				
29				
30	1	1		7.2

		acoon*	27/702			
	Day	zath	Day	23rd Day		
RBC WBC	4 590 000 8 455 2 Day	RBC WBC Polys Lymphos L monos	\$ 190 000 7 200 867 8900	RBC WBC Polys Lymphos Lymphos	7 040,000 7 050 3 7 93 6 100 100	
RBC UBC Polys Lymphos	4 910 000 7 759 15%	Baso Stabs Shift	100 100 1270	Eosin 27th		
L monos Baso Turck s Eosta Stabs	100000000000000000000000000000000000000	RBC WBC Polys Lymphos	Day 5 710 000 6 250 87.0	RBC WBC Folys Lymphos L monos Haso	5 110 000 7 000 2 50 84% 350	

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TABLE II -COMMON DUCT LIGATION --RABBIT 3

Day	Food sodine (gammas)	Fecal todate (gammas)	Lenary (adine (gammas)	Blood sudane (gammas per 100 c cm)
14	\$2.6			
	٥		Ja misse	3.9
3	0		Lost	
41	2 7	No feces	10	
5	6.8		Lost	
6	۰		5.4	
1	0	, 55 6	3.9	31 4

[&]quot;No blood counts were taken

Dated p 30 a m

and clinical, which seem to give added con himation to what we had ourselves witnessed. we decided to undertake some animal experi ments with the hope of adducing additional data on a subject which remains persistently obscure Three rabbits were employed, one being retained as a control while the other two were subjected to operation. Tables are appended which show the facts sought and the data which were secured

The sodine content of the daily intake of food is expressed in gammas for each successive day. It will he noted that the iodine elimination in urine and feces is likewise recorded for each day. It should be mentioned, however, that inability to prevent contamina tion of the urine makes these data more or less untrustworths Allowance must be made for this fact. The iodine content of the urme has been demonstrated to vary with the kind of food ingested the time of day, state of the weather, age of the subject etc while the todine content of the blood remains relatively unaffected by such external conditions (Curtis)

In Table I for control rabbit, Rabbit 1, it will be noted that the blood iodine never went above 17 5 gamma even when the sodme constituents of the food raised the intake to 226 gamma and maintained it at that level for three successive days. These figures were obtained on the basis of a normal jodine content of the blood being 44 gamma

Rahbit 2 was subjected to common duct ligation, after having been under preliminary observation for a time sufficient to establish

its normality at the outset of the experiment Silk suture material was employed in the hgation Estimation of the blood rodine on the third day following common duct ligation showed it to have risen to 31 4 gamma. The blood counts on succeeding days, as well as the date of the appearance of saundice, are noted

Rahhit a was likewise subjected to common duct ligation and, in addition on the third day thereafter, to division of the duct. The animal remained under close observation for 22 days thereafter During this time the food of this rabbit and of control Rahhit 1 was precisely the same, yet in Rabbit 3 the blood iodine rose to a high point of 227 gamma and was 224 on the same day that of Rahbit I was but 12 7 Just before death, on the twenty such postoperative day, the blood sodine fell to 62 gamma

These experiments together with clinical observations made during more than 2 years have convenced us that the inver plays a very important part in the maintenance of a normal blood todine, arrespective of the Lind or amount of food ingested

EVALUATION OF STUDY

In considering these findings the question naturally arises. What part of the liver is concerned in the retention of jodine in the blood? This question still awaits an answer. but it is our impression that the Kupffer cells, which are the hepatic representatives of the reticulo endothelial system, play a leading role in this mechanism

In the parenchyma of the liver there are two chief types of cell te the hepatic cells and less numerous and important the stellate cells of Kupffer 'These cells" to quote Mann, "are ordinarily now considered as not pertaining ontogenetically to the hepatic organization, but rather to the system of macrophages which abound elsewhere in the Kupfler cells were originally con sidered a part of the endothelium of the hepatic lobule and were often designated as specialized endothelial cells fbut is far more likely that definitely organized endothehum does not exist within the hepatic

lobule, but that a syncytial membrane, to-

TABLE III —COMMON DUCT LIGATION FOL-LOWED BY DIVISION OF DUCT—RABBIT 3

1.0	ALD DI DI	1151011 01	DOOL W	
Day	Food todine (gammas)	Fecal todine (gammas)	Urinary iodice (gammas)	Blood todice (gammas per 100 c cm)
	10 7			
	3 4		No urine	4.4
3*			No urane	
4	2 6	no feces	Lost	
5	6.8	no feces	No urme	
6	2 6		216	
- 7	4 9	7 5	4.5	
89	3 8	i	No urine	
	3 4		350	
10	1 5			
11	5 6		No urine	
127	44	i		
13	3 4		3.7	
147	60		310	46
15	51			
16	5 1		583	
171	8 3		603	
18	108		121	
199	10 8			
20	316	1	158	
25	233		—	217
72	222			
231	10 2	_	·	274
24	14 2			804
25	7 7		$\overline{}$	
26	15 4			
27				62
28				
20				
301				

*Operated upon †Jaundice first noted ‡Died 9.45 a.m

14th Day

5 580 000

RBC WBC

THLOOD COUNT 8th Day Polys RBC 5 218 000 Lymphos Baso Eosin WBC I. monos 12 700 Baso Stabs 12th Day Fosin RBC 6 800 000 Nucleated RBC 5 Stippled RBC about Stippled RBC 40 Polychromasia RBC varied slightly in size 10 800 Poly 5 Lymphos Polychromasia RBC and shape L mono varied slightly to size Rasa 23rd Day and shape 10th Day

5 140 000

17 150

RBC

N BC Polys

Lymphos

RBC 5 380 000 WBC 17 330 Polys 30% Lymphos 30% Transitio

Nuc

gether with reticular fibers, separates the hepatic parenchyma from the intralobular capillaries, so that in reality body fluids of the vascular system actually bathe the parenchyma cells as they circulate through the hepatic lobule Phagocytosis characterizes the functionally active Kupffer cell It seems clear the Kupffer cells of the liver are a part of the changing system of histocytes or macrophages which have been designated the reticulo-endothelial system"

Accepting Mann's conclusions as to the Kunffer cells' nature and function, it is not unreasonable to assume that their physiological activity may have an even further reaching effect than this assumption includes. As far back as 1928, Jaffe and Berman, of the University of Illinois Medical School, demonstrated that these cells are largely concerned in the metabolism of fat. In the course of their experiments rabbits were thyroidectomized and injected with fat droplets. The results showed that lack of the thy road interferes with the quick elimination of the fat droplets through the hver These observations clearly point to activity of the reticulo-endothelial system of the liver in the regulation of blood iodine, even though research has not yet been far enough extended to produce positive proof

Some of the autopsy reports upon patients who died in the "liver death" syndrome are of interest in this connection. Heuer speaks of the "quite consistently striking degenerative changes in the liver and Lidneys The liver showed leucocytic infiltration, necrosis, and interstitial hemorrhages, or marked parenchymatous and fatty changes, most marked about the gall-bladder fossa" Schutz and bis co-workers found "either leucocytic infiltrations, necrosis, and interstitial bemorrhages, or marked parenchymatous and fatty changes" And "in all instances in which gallbladder disease was the reason for surgical intervention," these authors obtained "a history of long standing cholecystitis and, at both the operation and the necropsy, liver

9% varied slightly in size
1% and shape
6% 27th Day
C 17 RBC \$ 350 000
44 WBC 16,350
1 RBC Polys

Lymphos
L monos
Baso
Stabs
Shift
Nucleated RBC
Stippled RBC

43

4-

43

44

45

45

4

SURGERI, GINECOLOGI AND OBSTETRICS TABLE II — BLOOD IODINTI BEFORE OPERATION

TABLE II —BLOOD GOODNE BEFORE (Alterna D_{L.e} 1-12 CO OPERATION—Continued Darana D-22 4 Adear collar gotter 22 1-2 GATETRA $D_{k,g}$ 4 /cmambers 1 500 , D 22-12 4 Torr notal coline 7 1253 Darman - 6-- 1 Andre entre Freeze 4 4 Tone adentes 2 15- s o freezew bergs Temm of pascetts 31---~1 4 2 VET TENDEN 4 1 Toxic a ironna ef a troa. Sz ---A- tiller to bed 1 must 5--2~ I H with the 4 4 Toxic admora .. L Branch -5- 5-1 t Emerger truth o Dr. - mas 45 3-47 The Production of the Parish Parish 4.4 Chamman man bear , 5-4ž \$ 5 Erepaste fate O'CRE PUR SERVER 60 , 5-house have a character by מש בל שנת اعدد صنعا 5---ביין כ ביונטאי ביונט 5 5 Incume assessed 2 2 12 5--וס האושטון דיים S E-BELL CO-PETERS ŧ 1 r-, . Farifico LA O SENATUR Characters ٤, - p- ~your coasten mark ward · totte sprendens F 3 6.50 Communication of servering 2 . Votat cile 15of Christopher and street devices 1-Brendad eretuding J-7-3 1 / CTODERS CONCRETE ומשו מניים ¢\$ 15-15-3 4 f Orentz Cref. L. G Tombe & Decores . . V 15-24-3 VALUE OF TOPRIE Cres charges and since 2- 0a I wind Adminiation throad an bemerk out - -01 /2 at case tree H persons 5-15the Court Constituted and times Eventually has been taking lang de-2 / 3-2-3 S O G.Z.o Futte Danie Danie allas \$ 13-5-S . 3 3 (T'L OTEN IO Lamanta o Lamanta -4 Cress pract chross strendies hat calm admini 5o p Herman France - TENER EVER 3-5-1 Errabita Fra H perturate 3-6 ---5 6 ANDROGRADE AT METAL THE 8 Lune anner 5 mer 3-2-4 (Produce a constant 1) 4 215-2 י היונטסה ניות 26 /a + com F = ٠, 50 CARGE OF STETUS C- 6-20 CONTROLLED FRANKISCH . 1 Convert challenges of possible career o aver e = of Penalse the same -1-++ Howards atreat A 5 A more as had time discussion areas. 71 £z Adenama of theread 4-25oo Truck bris are ~ •44.3 H perpusas throad Historick Brank County Late 1971 ~2 land chia sour ~ 5-2 165-1 at least ich alexen o (with E for possible fall street 45 45 1 2-1- 1 47s o Berga tiera, a limina, la marchia cres Hope wings at ٠, 4725 1 - - 5 s o Breaky 13 t Activities of the hadder 22 0125 e-20-0 \$ 1 James come from The recuis on varieties up method of are not refinished 11 - C. th Charters F - Charters of A Here Land F CE CI 52.4

TABLE IV -BLOOD IODINE BEFORE OPERATION-Continued

TABLE IN -BLOOD TODINE BEFORE OPERATION -- Continued

١٥	Date	Gamma 1-100 c cm	Diagnosis	∖ o	Date	Gamma 1 100 c cm	Diagnosis
92	4-29-36	12 9	Toxic adenoma of thyroid	133	8-27-36	6 2	Aodular colloid goiter
93	4-29-36	23 0	Thyroid adenoma with retrograde changes	134	8-27-36	19 6	Carcinoma of gall bladder
91	4-30-36	11 1	Benign fetal adenoma	135	8-21-36	2 920 O	Chronic cholecystitis fibrous subacute stooes
95	4-30-36	3 6	Colloid goiter	136	9-6-35	5 2	Lymphatic leucemia
96	4-30-36	4 6	Recurrent hyperplastic (th) soidectomy 1921)	137	8 -31 -36	S 7	Either Hodgkin's disease or tuberculosis of lymph glands
97	5- 1-36	4 3	Prolapse of rectum thrombosed hemorrhoids	235	0-17-36	40 S	Cholangitis acute due to biliary tract infec
93	5- 1-36	2 250 0	Obstruction of common duet				tion
99	5-6-36	6 3	Diffuse nodular colloid	139	9-17-36	18 7	Chrome cholecystitis with stones post
100	5-0-36	4 7	Chronic cholecy stitis (?) no tones	140	10- 8-36	13 1	Toxic adenoma decompensated heart
101	5-11-36	40	Carcinoma of stomach inoperable	241	10-12-36	2 5	Chronic cholecystitis fibious
102	5-13-36	_ 3 7	No diagnosis given	_	10-16-36	4 9	Chronic cholecystitis with stones
103	5-13-36	3 7	ber ous exhaustion intercostal neuritis	TAS	10-21-36	3 3	Chronic sipusitis chronic appendicrtis
101	5-13-36	4 5	Sciatic chronic cholecy strits with stones			6 2	Nodular colloid goiter toxic diffuse
105	5-16-36	6 9	Acute bronchitis	144	10-26-36		
106	5-16-36	4.2	Acute hydrops of gall bladdes	143	10-27-36	200 0	Hypertension is taking Lugol s etc.
107	5-16-36	5 0	Chronic appendicatis	146	1136	31 6	
108	5-18-36	4 6	Chronic cholecystitis with atones	147	11- 6-16	4 7	Chronic cholecy stitis with stones
100	5-18-36	14 3	Benign thy roid adenomas and damaged hears	143	11- 7-36	4 2	Menopause
110	5-19-36	60	Portal cirrhosis of liver ascrees and jaundice	149	11- 7-36	11 3	No diagnosis alightly enlarged gall bladder
111	5-23-36	6 6	Benign thy roid adenomas with bemorrhage	150	11-13-36	6 6	Epilepsy idiopathic
113	5-15-36	5 3		151	11-14-36	7 1	Hypertension
tis	5-25-36	3 7		152	11-16-36	7 9	Adenoma of thyroid fibioid of uterus
111	5-16-16	4.3		153	11-16-36	77	Hyperplastic thyroid
115	5-28-36			154	11-30-36	5 8	Hirsutism hypegonadism
116	6- 3-36			155	12- 2-36	40	Slight obesity
117	6- 8-30			156	12- 8-36	5 5	Hyperplastic thyroid
118	6-16-30			157	12-11-36	8 7	Large diffuse nodular toxic thyroid
110	6-16-36			258	12-12-36	8 5	Nodular tozic colloid
120	6-16-36			159	12-14-36	3 2	Thyroid adenoma recent focal hemorrhage
121	6-20-36			160	12-16-36	4.8	Breast duct hyperplasia with inflamma
122	-	500-18		161	12-16-36	6 0	Endometrial polyp postoperative
123	6-23-36	2 5	Endocervicitis endometritis salpingitis and	162	12-16-36	6 2	Multiple fibroids with uterine polyp
114	6		appendicitis	163	12-17-36	2 0	Ovarian cyst left
125	-			164	12-23-36	8 7	Uremic poisoning decompensated heart etc
125	7- 6-30	-	Chronic cholecystitis subacule	165	1 -23-36	5 0	Benign fetal adenoma of thy roid
127		-		166	12-28-36	6 0	Nodular colloid adenoma
125	7 11-36	-		167	12-29-36	5 6	Facial neuralgia
	7-14-30			163	12-29-36	7 1	Nodular colloid gotter had todine 2 days ago
129	7-23-30	3 370	Chronic nolecystatis chronic thickening of appendix	169	12-30-36	5 3	Hypertensive heart disease vasomotor
130	7-27-3	470	Benign fetal adenoma had taken iodine	170			trouble
131	7-28-3	13 4	Chronic cholecystitis with stones (3 wks postoperative)	175	1~ 2~37	27 5	Chronic chalecy stites with stones
132	7-28-3	3	o No diagnosis complaint pain in back		z- 6-37	<u>4 7</u>	Chronic cholecystitis and general neurosis Diffuse nodular toxic colloid goiter
							nodora rotic conoid goiter

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TABLE IN -BLOOD HODINE REFORE OPERATION -- Concluded

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	-		The State of the S
١٥	Date	Gamma 1 100 e cm	Diagnoris
13	3~ 7 37	11 3	Tone hyperplant! thyroid
174	1 -37	5 2	"odust colleid gotter (?) cervix
175	1-8-37	409 0	Chronic cholecest Lawith scores
176	z 3-37	4 2	Asth na
17	1-8-3	6.8	11 ypertension
1 8	1 6 37	500 0	Chronic cholecystitis ovarian cast
1 9	2 9-3/	4 3	Lilaters) salpingitiz
122	1 13	-8	odular couloid guter diffuse tonic
being t	the draws such in T o had term nidence is nimits in s	sittografia r 71 side redechose t su rhre	e had ordine administered within a days pre- b and simple for soline subjects are noted as with the exception of patients ag is say and i pit taken one day before drawing the bid of his bine days is insufficient time to all a phene lightche in in some live and gall blad in the presentation of the patients.
			1 11 1

damage of considerable duration was en countered In no case did they feel they had reason to believe that death was due to cessation of liver function, but rather to it

perversion It would seem not unreasonable to assume that ' liver death" results from the placing o an extra strain upon a liver the Rupfler cell of which have been previously impaired 'Se long as the liver is put to no strain and stres other than that of ordinary living, to v buch i has accustomed itself so to speak, it is quite canable of carrying on But when operation is undertaken an entirely different com plexion is put on the matter. Even in the most tavorable cases there are introduced alone or in combination the stram of the anesthetic the trauma of surgical manipula tion the drop in intra abdominal temperatur and the changes in intrahepatic and biliar pressure. The result is that a liver which i already the seat of a pathologic process i unable to cope with the added strain and it function promptly fails the liver cells, a they become increasingly unable to fulfil their function undergo some necrotic change, part ly because of failing function and partly be cause of the changes in intrahepatic pressur brought about by operation (1)

The value of the blood todine estimation a a preliminary to any operation upon th biliary tract is indirectly emphasized by

TAI	HE 1 -	-BLOOD IOD	INEPOSTOPERATIVE
35	25-1-225kg	atestituseter- apport	CONTRACTOR
		Garner 1 in 1-200	

-	50	Dat	C CTS		Diago Nis		
			PO		1		
-	42	* t2 36	649 0	t /s 6	Chronic cholecystitis possible can cer of liver		
	47	2-20-36	16 6		Colloid gorter possible gall stones		
-	40	1-25-36	23 6		Acute hydrops of gall bladder		
-	62	3-7-16	3 0		Subscute cholocystitis		
-	83	5~ 1-56			Subarute cholecystitis		
~	6,	5- 8-ch	6 920	Died	Corresp duct obstruction		
-	65	3-8-36	560 0		Chrosic cho-provists with stones carete ma		
1	11	3-20-50	2 000 C	40 D	Chronic cholecustitis with stones		
1	ša	4- 6-55	100 0		Chronic cholecystitis and chronic appendiction		
•	93	3~ 1-36	2 00	Died	Common duct ob-truction		
	100	3~ 9-36	4.7		Chron cholecratitis (*) no stopes		
	200	\$ 10-36	4 2		Acute hy drops of gall blad fer		
đ	105	5-28- /	4 6		Chronicah egystatus with stones		
9	112	5-19-30	00		Portal curbous of liver was ascited		
S	112	-25-55	3 3	-	Cancer of liver (nodules on liver)		
	155	3-25-30	5 0		Chronse cholees status subscute		
e J	110	0~ 1−3 0	3 0		Portal carrious of in er ascites and		
s	1>2	6-20-36	500	18 5 2 Wks	Chron: cholecystata with stanes		
s	113	3- 0-10	20		Chron e shakes stitu subscute		
ť	215	? 6-36	19∈ 0	1 AFT 13 0	Chronic cho acritizis and chronic		
י	117	7-31-36	3 3		to diagnoss enlarged gall bladder		
e	129	7 23-36	1100		Chr nic cholecystitis chronic th kened appendix		
ď	131	7-23-36	13 0		Chronic chalery: itis with stanes		
e	134	7-25-36	10 6		Carcinoma of gall bladder		
c.	\$35	8-11-36	1900	50.0	Chronic ch lecystates fibrates sub- acute stones		
} S	1,13	9-17-56	49 S	6.4	Cholane in seute due to bilare tract infection		
5	133	p-17-36	15 7		Chronic cholecystitis with stones postoperative		
S	141	10-11-16	8 5		Chronic cholecystatus fibrous		
s	147	10-19-19			Chron e c olecy st tas with stones		
	147	22-5-36	4.7		Chronic cholocystitis with stones		
•	213	21- 7-36	11.3	1	None slightly colarged gall bladder		
e	170	1- 2-37	27 €	1	Chrone cholecystatas with stones		
	575	1-6-37	4.7		Chronic cholocystitis and general		
S	175	2-8-17	400 0		Chronic choles, time with stones		
e F	178	1-9-5	\$60.0	5 1 mo	Chronic cholocy states avarian cyst		
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Schutz and his colleagues when they state that "it is difficult, if not impossible to estimate the degree of liver damage which is present prior to operation, since it is rather definitely demonstrated that the liver function, so far as its physiologic activity is con-

cerned, is not disturbed " Several years ago Graham proposed a roentgenological dye test. He had observed that in patients who died "liver deaths" following relatively simple operations on the biliary tract, there had always been high re-

tention of the dye used in the pre-operative x-ray examination "We have noted," he says, "a striking reduction in our operative mortality in cases of disease of the biliary tract since we began to pay attention to the information provided for us by testing the excretory function of the liver "

We feel that our plan of estimating the blood iodine, giving a correct interpretation of the relation of the liver to the storage of iodine in the blood, is of higher value than any of the tests previously recommended

SUMMARY

The observation that cholecystitis, cholelithiasis, and hepatitis are invariably accompanied by a high iodine content of the blood suggested the use of the blood rodine estimation as a measure of liver efficiency Animal experimentation was undertaken to ascertain whether operations upon the biliary tract influenced the blood jodine, and if so, to what extent The results of this experimentation are set forth in tabular form

The information thus gained is of interest in connection with the so called "liver deaths," concerning which much has appeared in recent medical literature. The autopsy findings in such cases throw light upon the part played by the liver in the metabolism of iodine, and also in some instances, suggest exactly what part of the hepatic structure may be concerned in this metabolism. It is the author's belief that iodine metabolism is the function of the stellate cells of Kupffer References to literature tending to confirm this theory are cited

Reference is made to present day tests of liver function which are now employed as preliminaries to operation upon the gall bladder and ducts The estimation of blood iodine adds another very valuable test to those now in use

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THE EFFECT OF SURGICAL DRAINAGE ON KIDNEYS DECLARED FUNCTIONLESS BY PRESENT TESTS

OF RENAL FUNCTION

MAURICE GEORGE SCHULHOF, M.D., M.S., Roches et Monesota INTRODUCTORN NOTE BY HUGH CAROT M.D. F.A.C.S.

The term functionless kidness has been occurring in urological literature with in creasing frequency since the development and perfection of a variety of methods of testing Lidney function the most recent of which as that of intravenous prographs. It has not I think been sufficiently appreciated that the word tunctionless used in this connection should be taken literally. These tests do show that there is no evidence of function. On the other hand they cast little or no light upon anatomical facts which in the last analyzis are of controlling importance. The great majority of these cases are associated with and apparently due to ob truction com monia at the ureteropelane junction, but also in other nortions of the areters above the bladder

Another point of importance is the extraor dinary and as yet unexplained influence of a stone in the kidney upon the evidence of renal function as tested by our present inaccurate methods. It has been well known for many vears that a relatively small stone lying in the kidnes and not producing any high grade obstruction may yet depress function to an extent wholly muleading it this evidence be relied upon Now the experimental work upon the effect of obstruction of the ureter, partial or complete upon the Lidney has been somewhat contradictors. The older ascumption that complete obstruction of the creter was followed by atrophy or the Lidney has been disproved. That some degree of bidronephrosis regularly occurs seems practically certain

The most important and often the most difficult point upon which to get accurate in

From the Department of Superv. The Marie Foundation, Submitted to the Faculty of the Gradians should the Carrenty of Ministeria in partial familiness of the expressions for the depths of Master of Science in Supervisor.

formation is the extent to which recovers or function will take place following satisfactors relief or the oh.tr.ction The theory that once hypertrophy of the opposite kidney has developed the damaged kidney will not again regain some portion of its functional capacity has been advanced and has connderably affected our plans of treatment. Many sugeons have had dinical evidence which led them to doubt the soundness of this conclusion, but such experiences are notomously unreliable in so iar as they depend upon evidence not based upon accurate and profonced studies which enable us to state the apparent functional capacity of the kidney before relief of the obstruction and over a connderable period following the more or less complete relief of the impediment

At my suggestion Dr Schulhof has undertaken a most poinstaking review of a large group of cases in which great or apparent com plete loss or function ext. ted and in which the obstruction was removed. His study has reguired him to exclude from his conditions the great majority of the cases on the grounds that they were due is to the presence of stone thereby introducing an incalculable factor or (2) because though the evidence of restoration of function was chancelly satufactors there was incomplete pre-operative or po-toperative study upon which to base a conclusion. It has thus occurred that he has selected for the basis of his conclusions a relaunch small group of cases. In these cases however the pre-operative and postoperative evadence seems very complete. His study 25pears to me to remove quite satisfactorily from the realm of unpre-con and personal oninion the problem here studied. The paper seems to be important as putting upon a sold basis the opinion held by many observers that

very great recovery of function can be obtained and that many kidneys having no apparent functional value can be restored to a degree of usefulness, which is of first class importance to the patient

HE present study was undertaken in order to supply clinical evidence on which to base an opinion that certain kidneys pronounced functionless by present methods of determining renal efficiency will respond to surgical drainage and display sufficient functional capacity to ment their conservation

It has been the contention of some workers, notably Hinman, that such rehabilitation does not take place He stated "The healthier side will gradually undergo compensatory hypertrophy which may be so capable of counterbalance as to render the work of its weak assistant unnecessary, disuse atrophy of which will progressively occur. The reapportionment of functional activity after alteration occurs by a competitive type of anatomic compensation " While his contribution is an excellent one, and has been the stimulus for further investigation, similar results have not been obtained by other careful workers in this field Joelson, Beck, and Moritz in their study were unable to agree with Hinman's conclusions Their experiments did not demonstrate any renal atrophy of disuse, and, in fact, strongly suggested that such atrophy does not occur They said 'In view of the experimental data, the theory of renal coun terbalance need not be seriously considered in deciding the surgical treatment for certain renal lesions "

Clinically, there has been lack of confirmation of Hinman's theory that when renal function is disturbed by obstruction on one side, atrophy of disuse follows when the obstruction is removed and the kidney is placed in functional competition with its hypertroplued fellow on the opposite side Guiterrez asserted that it was remarkable to note the functional powers of regeneration possessed by a kidney with hydronephrosis Walters concluded that there was a remarkable return of renal function after the removal of obstructing lesions Crosbie and Dix asserted that there were

many cases in which excessive renal destruction and low function gave rise to the question of nephrectomy, but that many times after prolonged drainage sufficient function returned to make it worth while to save the kidney

PLAN OF STUDY

In order to ascertain the number of, and to study statistically, kidneys declared functionless and treated by conservative surgical drainage, it was necessary to review all the cases in which nephrostomy, pelviostomy, or ureterostomy had been performed at the chnic In this review, all cases in which renal calculi were present were excluded, since it is generally agreed that abeyance of function in such kidneys may be explained on the assumption of "reflex anuria," and hence such kidneys are not truly functionless Another group of cases, including those in which uretero-enterostomy was done, and of which there were a considerable number, were not studied because of obvious difficulties in determining postoperative renal function

Procedure A detailed history was obtained in all cases in this series, a thorough physical examination was performed, and special studies as well as routine laboratory tests were made when indicated A separate urologic

investigation was carried out

Roentgenograms of the urinary tract were made in all cases, the first of renal regions and upper portions of the ureters, another of the lower portions of the ureters, bladder, and prostatic region. This study revealed the presence, size, and position of the kidneys, and opaque shadows in the renal, vesical, or prostatic areas, occasionally, vesical filling defects were also noted, the vesical urine serving as contrast medium.

Preliminary to cystoscopic examination, blood urea and combined phenolsulphon-phthalein determinations were made, and on introduction of the cystoscope, the presence of any residual urine was noted. The ureters were catheterized, with aspiration of the renal pelves to ascertain retention. Indigo carmine or differential phenolsulphonphthalein studies were carried out and retrograde pyelograms made when indicated. Sterile specimens of urine from each kidney were

examined routinely, freshly strined smears of the centrifuged sediment were searched for organisms, and a portion of each specimen was cultured Immediately preceding the making of urograms, roentgenologic examination of the urmary tract was repeated Following the intravenous injection of the contrast medium. films were taken at intervals of 5, 15, 30, and 60 minutes Some "delayed films" were made after 2 hours Roentgenograms were made with the compression bag in place, the pressure being removed after the 15 minute exposure Upright, horizontal and delayed films were made in cases in which there was a history of postural relief of pain and in which it was suspected that there was abnormal mo bility of the kidneys. This was done in order to determine the degree of renal excursion as well as the presence of madequate dramage from the renal pelvis

In the group of cases finally selected for study, the diagnosis of functionless kidnes was based on the history, physical examina tion, laboratory studies including indigo carmine and phenolsulphonphthalean tests ex-stoscopic investigation, and recontigent graphic examination by means of intravenous

urography

Following surgical intervention the daily output of urine was noted, and the preoperative tests were repeated for purposes of comparative study

REPORT OF CASES

CASE 1 A woman 31 years of age presented herself at the clinic in 1930 with a history of dull pain in the lower left abdominal quadrant for a period of 3 or 4 years There was definite tenderness in the left costal angle on palpation. The urine con tained pus grade a but on culture was negative The value for urea was 24 milligrams per 100 cabic centimeters of blood Cystoscopic examination revealed mild chronic cicatricial arethritis Indigo carmine appeared from the right kidney in 7 minutes in a concentration of grade 2 no dee was seen to come from the left side in 15 minutes Retrograde pvelograms disclosed bilateral hydronephrosis of grade 4 A diagnosis of bilateral by dronephrosis and functionless left kidney was made Left nephrostomy was performed immediately

During convalescence, which was uneventful from 400 to ,00 cubic centimeters of unne drained from the kidney the specific gravity varied from 100, to 1011 Infection continued as was eventioned.

denced by the presence of pus grade 2 in the urine cultures of urine however continued negative Indigocarmine appeared from the right side in 12 minutes in a concentration of grade z there was an identical appearance time and concentration on the left The postoperative intravenous programs re realed a fair concentration of medium in the 20 minute film on the left and normal visualization on the right. The bilateral hydronephrosis of grade 4 persisted. In a recent letter the patient said that except for an occasional ache in the left lower quadrant she was enjoying good health. The nephrostoms tube was removed after 4 months and func tional studies revealed a concentration of indigo carmine of grade 2+ in to minutes from both sides The initiatenous urograms were described as un changed except that the pelvis of the left Lidney had contracted down to within normal limits

Case 2 A man 27 years of age was admitted to the clinic in 1930 with the complaints of burning and frequency of urmation hematura and a dull pain in the left lumbar region for 6 months. Roent genograms of the kidneys ureters and bladder nere negative. The vesical urine contained erythrom tes grade 3 and pus grade 3 Culture of the unne gave a growth of I roteus ammonia and Escherichia coli A combined phenol-ulphonphthalein test disclosed a return of 35 per cent of the dye Cystoscopy re vealed a rest rystitis of grade 2 and clear spurts from the right ureteral orince the left orince could not be located A differential function test with in directamine showed a concentration of grade 4 in c minutes on the right and a total absence of secre tion of dve on the left in 15 minutes

A diagnosis of infected hydronephrosis with functionless left Lidnes was made Vephrostoms was performed through the middle cally Following operation the output of urine from the left kidnes sole to between 200 and 1350 cubic centimeters for 21 hours the specific gravity of the urine varied from 1 cos to 1 cos The daily excretion of unne from the neht Lidney varied from \$25 to 2550 cubic centimeters and it had a specific gravity of from 1 010 to 1012 1 differential phenol-ulphonphthalein test gave a 50 per cent return of die from the bladder and 30 per cent from the left kidnes. The patient was dismissed in excellent condition with the ne phrostomy tube in place. The tube was removed by the patient's local physician it months later and the wound healed mucely. At that time the patient was free of symptoms and able to carry on his daily work

CASE 3 A woman 43 vears of age was admitted to the choice in 1950 because of recurrent lett lumbar pain of 11 months duration. In the month prior to her arrival at the china the had noted blood in her arine on several occasions. Frythrocytes grade 4 and puts grade 3 were noted in the unne but no organisms were grown on culture. There was distributed to the contract of the contrac

toscopy clear spurts were seen to come from the right ladney. No flux was noted from the left ureteral orfice in 70 minutes. A differential indigocarmine test gave a return of dye from the right side in 7 minutes in a concentration of grade 4, there was no appearance of the dye from the left side in 75 min utes. A diagnosis of bilateral hydronephrosis and

functionless left kidney was made Resection of the left renal pelvis and nephrostomy were performed. The urinary output after operation was hetween 600 and 1350 cubic centimeters daily from the left kidney, the urine having a specific gravity of from 1 006 to 1 013 The 24 hour speci men of urine from the right kidney measured from 400 to 1500 cubic centimeters, its specific gravity ranging from 1 008 to 1 012 The value for urea was 24 milligrams per 100 cubic centimeters of blood A differential function test with indigocarmine showed a concentration, grade 3, from the right kidney in 8 minutes and a concentration of grade 2 from the left kidney in 9 minutes There was a good concentra tion of medium on both sides in the 20 minute intravenous urogram. There was bilateral dilata tion of the pelvis and caly ces, grade 2 The nephros tomy tube was removed 2 months after operation

The patient returned to the clinic in 1933. At that time, an intra-enous urgaram was done, and pelves and calvees on both sides were well visualized in the 5 minute film. Caliectasis, pyelectasis and ure terectasis, grade 2, were still present as in previous examinations. The patient said that she had been enough excellent health and that her strength and

endurance were good

CASE 4 A woman, 34 years of age, was admitted to the clinic in 1931 with a history of left renal colic, and a mass in the left upper abdominal quadrant for the previous year. Her urine contained pus, grade 2, and culture gave a growth of Escherichia coli and Pseudomona. The blood contained to milliprams.

of urea per 100 cubic centimeters

Roentgenograms of the kidneys, ureters, and bladder were negative Cystoscopic examination of the hladder revealed normal findings Indigocar mine appeared from the right kidney in a concentration of grade 4 after 5 minutes, no de was recovered from the keft kidney after 15 minutes. Pyelograms revealed dilatation of the pelvis, caly ces and ureter, grade 3, on the left and grade 1 on the right. In the intravenous urograms visualization was absent on the left at the end of 60 minutes, function was unimpaired on the right. Left nephrostomy was performed, the Cabot technique heing used

The operative convalescence was uneventful Specimens of urine from the renal stoma contained erythrocytes, grade 1, and pus, grade 1, the vesical urine contained pus, grade 1. Pseudomonas organ lems were cultured from this urine. The output of urine from the hiadder ranged from 1000 to 1,900 cubic centimeters, its specific gravity being from 1007 to 1023. The left kidney excreted hetween 550 to 1040 cubic centimeters of urine each 24 hours, with a specific gravity of from 1004 to 1073. Two

neeks following operation, a differential phenol sulphonphthalein test showed a recovery of 55 per cent of the dye from the right and 23 per cent from the left. Intravenous urograms taken 6 months later gave fairly good visualization of the left kidney in the 20 minute film and showed hydronephrosis of grade 3, there was good concentration of medium on the right, showing hydronephrosis of grade I. In a letter the patient's local physician 2 years later said that the patient had gained considerable weight and that her general physical condition bad heen unusually good

CASE 5 A man, 45 years of age, came to the clinic in 1937 hecause of attacks of pain in the left lumbar region of 8 years' duration Roentgenograms of the hladder, kidneys, and ureters were negative. The value for blood urea was 56 milligrams per 100 cubic centimeters The urine contained erythrocytes, grade 2, and pus, grade 4 Cultures of urine revealed Proteus ammonia Cystoscopic examination was essentially negative Differential function tests with indigocarmine revealed a concentration of grade 2 in 15 minutes on the right and n total ab sence of secretion of die on the left Intravenous urograms revealed faint visualization on the right in the 20 minute film and no evidence of medium on the left in the 60 minute exposure. On retrograde pyelography, bilateral hydronephrosis, grade 4, was demonstrated A diagnosis was made of bilateral infected hydronephrosis, with a functionless left kidney and a reduction in function on the right

Bilateral nephrostomy was performed Immediately following operation, each kidney excreted be tween 800 and 1000 cubic centimeters of unne in 24 hours, with a ringe in specific gravity from 1 00. I of 100 Daily microscopic examination revealed moderate infection. Two weeks following operation, 20 per cent of phenol-ulphonphthalein was recovered from each kidney. At the time of dismissal, 1 month later, the value for urea was 42 milligrams per 100

cubic centimeters of blood

In 1933, 2 sears later, the patient returned to the clinic hecause of another complant (cholecystics). He volunteered the information at this time that his kidneys had given him no further trouble. Both renal stomas were functioning well and had given him no discomfort. The urine contained pus, grade 1, and the value for blood urea was 38 milligrams per 100 cubic centimeters.

CASE 6 In 1930 a man, 34 years of age, presented

humself at the clinic with the history of pain in the right lumbar region and hackache for several years Pus, grade 2, was present in the urine, but no growth was obtained on culture. A roentgenogram of the genito urinary tract showed no ahnormal shadows in the region of the kidneys, ureters, or bladder. A minute amount of medium was noted in the 60 minute intravenous urogram over the right renal area, while on the left, visualization and outline were normal in the 5 minute exposure. The value for urea was 20 milligrams per 100 cubic centimeters

of blood On cystoscopic examination, the right

ureteral orifice could not be seen but clear sportwere seen to come from the left unteral online Indigocarmine appeared from the left in a concentration of grade 4 in 5 minutes and was ab en if from the right in 15 minutes. A appear cent return of dis evizaobtained on the combined plenol ulphonphilalein test. 4 disgno is of functionlessingth kidnes was made and exploration was advised.

Nephrostoms was performed. The dash unmars output from the kidnes varied from \$5.0 to 10.50 cubic centimeters with a pecific gravits of from 1 000 to 10.01. The left kidnes excreted from 200 to 1800 cubic centimeters of urine day, with a specific gravits of from 1 00.7 to 10.6 The value for blood user commend expenses.

blood uses remained stationary. Twenty three per cent of phenolsulphonphthalein was returned from the right kidney and 32 per cent from the bladder with the differential test. Yu salization was good on both sides in the 13 minute urogram, the pelveuretery and calves were within normal limits. The

nephrostom: tube was removed a vear later at which time the patient was doing his usual work. CASE 7. A man aged 43 years came to the chine in 1934 complaining of dv una frequence of unnation, and hematime of a verse division. His union

tion and bematura of 3 years duration. If its urine contained errithrog ties, grade 1 and up grade 4 and on culture was found to contain nucrooccus. The value for blood uren was 22 milligrams per 100 cubic centimeters. Cystovopy dichosed an infiltration out the left lateral wall do e to the spinish straing tumor into him gift englis lateral and potention wall of the hisdder and also a sugge tion of militration on the left lateral wall do e to the spinish current and the strain was suggested to the strain and th

function. On the right there was no visualization of medium in any him including the 60 minute one 4 diagno is of equamous cell carrinoma of the blad der bilateral hydronephrosis and functionless right kidney wa made.

Bilateral cutaneous ureterostomy was performed.

The urmar output for 24 hours on the left was from 1000 to 1500 cubic centimeters with a range of specinc gravity from 1 010 to rots. On the right the dails excretion was from 750 to 1 000 cubic cents meters and the specific gravity samed from 1 012 to 1 014 A differential phenol-ulphonphthalem test gave a return of 30 per cent on the left and 19 per cent on the right. The value for blood area remained normal (18 milligrams per 100 cubic centimeters) Retrograde prelograms taken 2 weeks after opera tion di closed a normal pelvis and calvee- with dila tation of the ureter grade 2 on the right and normal pelvis calvees and ureter on the left Intravenous urograms revealed beginning visualization on both sides in the 3 minute film and good visualization in the 20 minute film with outlines coinciding clo els

with those in the pyelograms A cour e of deep

rocatigen therapy was given as soon as the pot-toper after condition would permit. The patient returned for re-examination 4 months later. Intravenous urography revealed to change and the function of both kidney, on this bir was thought to be good. It was learned that this patient died 14 months later.

Case 8 In 1933 a girl o years of age was brought to the clinck having had pain in the left fank since the age of 5 cars. A eatheteneed specimen of unon was negative on routine cammation but on culture the Excherichia coli was obtained. The blood urea was so milligrams per noc ouble centimeters. O di mars toentgenograms of the Lidney's wreters and bladder were negative. There was a normal appear ance time and concentration of medium on the right in the intra-caous urogram. The outlines of the police cilyce, and ureters were within normal hims. O at the left there was only a faint suggestion of medium in the 60 minute film. A diagnosis of left hydrographic is and functionless kidney was rade.

Plastic repair of the renal pelvis was carned out followed by decap ulation and a Cabot type of nephrostom. The output of unne from the left kid nes varied from 100 to \$50 cubic centimeters for 24 hours. The dails output from the bladder ranged from 250 to 2 200 cubic centimeters. Un doubtedly a portion of urine excreted by the felt kidnes pas ed into the bladder. The specimens from the bladder and nephro tom; tube were negative micro copically Culture continued to show the Eschenchia cols in urine from both Lidneys The value for urea was 24 milligrams per 100 cub c centi metera of blood, Intravenous urograms taken 3 weeks after operation di closed beginning visualiza tion on both sides in the a minute film good con centration on the right in the 20 minute expo-are and best visualization on the left in the 60 minute The left calvees pelvy and ureter were di lated grade at the right kidnes was normal. This nationt has not been heard from since dismissal.

CASE 9 In 1933 a man a S vears of age came to the clinic with the complaints of di una frequency and hematuria for a year. An ordinary roentgenogram of the abdomen wa negative. The blood urea was 40 milligrams per 100 cubic centimeters. The urine contained erithrocytes grade 1, and pus cell grade 2 Aerobacter aerogenes was cultured from the urine Casto copic examination revealed a grade 4 squamous cell epithelioms of the bave and left wall of the bladder in the region of the left ureter \o purt was cen to come from the left ureter. The intravenous urograms were normal on the right There was no evidence of medium on the left in any film including the 60 minute one Suprapubic crate tom: was done with julguration of the les on and insertion of radon seeds. Three months later bilateral cutaneous uretero tomi was performed Immediately following this operation the daily un nary output on the left ranged from 100 to 500 cubic centimeters with a pecinic gravity of from 1 coo to 1017 On the right the 4 hour output was from

450 to 3,400 cubic centimeters, with a specific gravity of from 1008 to 1010. The phenolsulphon phthalen test showed a return of 15 per cent of the dye on the left and 29 per cent on the right. The intravenous urogram revealed normal outlines appearance time, and concentration of medium on both sides. The value for blood urea was 36 milligrams per 100 cubic centimeters. The patient was dismissed 3 months following the second operation with the ureteral stomas functioning well.

Case 10 A man, 52 years of age, registered at the clinic in 1934 with a history of pain in the left flank and intermittent hematuria for 3 or 4 years. The urine contained pus, grade r, and on culture gave a growth of Escherichia coli and Proteus ammonie The value for urea was 44 milligrams per 100 cuhic centimeters of blood Intravenous programs revealed no visualization on the left in any film. The right side was normal in outline, appearance time, and concentration of medium. A diagnosis of functionless, infected left kidney and hydronephrosis was made, and left nephrostomy was performed. On the nineteenth postoperative day an intravenous uro gram was made There was fair visualization on the left in the 5 minute film, concentration of the me dium being best in the 20 minute film. The outline of the kidney was normal except for slight dilatation of the middle caly The right Lidney appeared normal as before The urine contained pus, grade 3, and on culture of urine from the nephrostomy tube Escherichia coli and Proteus ammoniæ were found The urinary infection was cleared up before the patient was dismissed, on dismissal the nephrostomy tube was still in place Three months later the tube was removed by the patient a local physician, and one year after his dismissal the patient wrote that he was enjoying good health and was free of s) mptoms

SUMMARY

In 260 cases in which surgical drainage was performed on the kidney for conditions other than lithiasis, 40 operations were performed on apparently functionless kidneys. Of this group, 10 cases were selected because relatively complete studies were carried out which appeared to authorize the drawing of conclusions. It will be noted that the 10 cases are divided into 2 groups the first 6 cases comprising a group in which complete preparative and postoperative studies were made, the last 4 a group in which intravenous urography alone was used as a test of differential function.

In these to cases 4 of the patients were females, 6 males The average age at the time of operation was 38 years, the youngest patient being 9 years old and the oldest, 52 The

average age at the onset of symptoms was 35 years. Thus the average time which elapsed between the onset of symptoms and operative intervention was 3 years. Although it is impossible to state with any accuracy the length of time during which renal function had been impaired in these cases, it was doubtless sufficiently long to produce compensatory hyper-

trophy In g cases there was pus in the urine Positive cultures were obtained in 6 cases, Escherichia coli being the predominating organism Pseudomonas, Proteus ammonire, Aerobacter aerogenes and micrococci were other offenders In 4 cases in which Escherichia coli had been demonstrated before operation, it could not be cultured from the postoperative specimens The value for blood urea was normal in 8 cases before operation, abnormal in 2 In 8 cases the left kidney was involved, in 2 the right kidney In 8 cases nephrostomy was performed, while in the 2 remaining cutaneous ureterostomy was resorted to In 5 cases in which both dye tests and intravenous urography were employed to ascertain differential renal function, there was close agreement between the 2 concerning the state of renal efficiency In most cases the period of time which elapsed between the operation and the postoperative tests of renal function was about 20 days

Effect of dramage Definite improvement was noted in renal function in each of the 10 cases as a result of surgical dramage. In 4 cases the dramed kidney functioned equally as well as the opposite kidney, in 5 cases function returned to approximately 50 per cent of that of the other side, and in 1 case function returned to the extent that good visualization was delayed to the 60 minute intravenous urogram

CONCLUSIONS

It appears from this study that Hinman's theory of renal counterbalance is not supported by the clinical evidence. On the basis of the tests which were here applied, the kid neys were found to be functionless, but following surgical drainage there was a return of function.

A kidney cannot be declared functionless by these tests short of determining its complete absence or complete destruction, and the only useful criteria of the extent of renal function, therefore, would appear to be exploration and dramage

Many so called functionless kidneys are valuable and should be preserved

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LOW BACK PAIN AND SCIATICA

Its Etiology, Diagnosis, and Treatment

A GURNEY KIMBERLEY, M D, D Sc (Med), Portland, Oregon

GREAT number of anatomical variations may exist at the junction of the lumber of the property of the property

Under the soundest of mechanical arrangements one encounters at the lumbosacral junction, it is still the most vulnerable portion of the spine and is subjected to the greatest strain It is the meeting place of an articulated column (the spine) with a relatively immovable structure (the pelvis) The axis of body weight falls anterior to the lumbosacral juncture and makes an angle with a line bisecting the first sacral vertebra to a degree proportional to the obliquity of the upper surface of the sacrum with the horizontal. The lumbosacral joints must bear the body weight and, in addition, any weight lifted by the upper extremities or borne upon the shoulders Often lifting is done near the extremes of motion permitted by the spinal joints, so that its leverage is great and the resultant stresses magnified Faults of posture increase the stresses present in proportion as they shift the axis of weight bearing from a center passing through the lumbosacral junction

The foramina between the sacrum and the fifth lumbar vertebra are usually the smallest of the intervertebral foramina, yet they contain the largest of the spinal nerves. These nerves, together with their surrounding plexus of veins, almost fill the canals. The walls of the bony canal through which the fifth lumbar nerve passes are of peculiar interest, for postenorly are the posterior spinal articulations, antero internally the intervertebral disc, and postero-externally the lumbosacral and ilio-

From The New York Orthopedic Dispensary and Hospital now at Portland Clinic

lumbar ligaments The dorsal primary division of the nerve turns backward to supply the sacrospinalis muscle, and in its course runs close to the lateral aspect of the posterior articulation supplying the joint capsule itself

These relationships make it possible for the fifth lumbar nerve to be affected by the slightest of inflammatory changes in the posterior articulations, by extrusions of the annulus fibrosus or nucleus pulposus, by any change in shape or size of the canal secondary to displacement of the fifth lumbar on the sacrum or atrophy of the intervertebral disc. A somewhat comparable situation is faced by the fourth lumbar nerve, which, however, is smaller and its foramen slightly larger.

Ligamentous and muscular injuries following excessive strains or unexpected loads, or the gradual weakening of soft tissue supports that come as the individual recedes from his prime may throw upon this vulnerable area a load it is not prepared to assume, and there result the symptoms and signs of lumbosacral strain

The shight margin of safety present in the asymptomatic individual by reason of soft tissue support is further jeopardized by (r) anatomical variations from the normal which either cause increased motion at the expense of stability, or, by reason of their asymmetry, produce abnormal stresses, (2) degenerative changes, a resultant of the excessive trauma to which this area is subjected

ANATOMICAL VARIATIONS IN THE POSTERIOR ARTICULATIONS

The articulations between the lumbar vertebre are in the sagittal plane. At the lumbosacral juncture the plane of the joints may range from the sagittal to the coronal. The latter allows rotation and more lateral motion, as well as flewon and extension, but does so at the expense of stability. The tilt of the articulations often varies on the two sides,



Fig.: Illustrating absolute a ymmetry of the posterior lumbosacral articulations and a spina bibds occulta, find ings corroborated at operation. In the interlaminal pace between the pret sacral and the fifth lambar is seen a pub of bone representing the anlare of the pinous process of the fifth lumbar. The right transverse process of the fifth lumbar is large but forms no pseudarthrosis with either the sacrum or ilium Patient was entirely well 3 years after a pinal fu ion of first sacral to fourth lumbar veriebra.

one may even be in the sagitful plane while the other is directly coronal (Fig. 1) As they vary in direction so they may also vary in size

In 3 000 roent enograms of the lumbosacral spine Brailsford found that in 57 per cent the postenor articulations faced backward (coronal: 12 per cent inward (sagittal) and in 31 per cent they were grossly asymmetrical Actually in specimens of the human skeleton and at lumbosacral fusion operations, one seldom finds absolute symmetry of the joints in either size or shape. Generally too the posterior articulations will be found transitional between the coronal and sagittal planes. and more often approach the former To find a person suffering from low hack pain in whom the posterior lumbosacral joints are symmetneal and exactly in the sagittal plane is so rare at this clinic as to excite much comment. If the posterior articulations are coronal but

exactly similar, motion is free and smooth However, its greater range puts more strain upon supporting ligaments and muscles Where asymmetry exists the movement on one side must be eccentric to movement on the other, and trauma with resulting synovitis and arthritis can be easily induced. By irritation of the fifth lumbar nerse branches supplying the supporting ligaments and muscles of the joint and its cap ule, and hy reason of inflammation spreading to contents of adjacent intervertehral canal pain radiates in fifth lumbar nerve distribution in back and lower extremity. As elsewhere in the hody when toints are inflamed muscles attempt to splint the joint by going into tonic spasm thus causing more mu-cle fatigue and tenderness and completing the picture of lumbo-acral strain

Where the joints are asymmetrical, partial subluxation with locking is more likely to take place accounting perhaps for some cases of sudden onset of low back pain accompanied by a definite snap and for sudden relief from the same pain with a definite anan either spontaneously or as the result of manipula tion Subjuxations are sometimes seen at oneration, especially when there has been some

atrophy of the intervertehral disc

Some degree of asymmetry of the posterior articulations is seen in most roentgenograms taken of the lumbo-acral area in persons suffering low back pain. In 30 cadavers selected at random by you Lackum none had exactly symmetrical lumbosacral joints though 6 were nearly so Eighteen were grossly asymmetrical and the 6 remaining more or less so. The constant trauma of eccentric motion may cause permanent outcoarthritis of the joints and chronic inflamma tors changes in the structures contained in the adjacent intervertehral foramina. It has been noted in cadavers and at operations that when the lumbosacral joints are asymmetrical the joint closest to the coronal plane will have the more marked arthritic changes

POSTERIOR DISPLACEMENT OF THE FIFTH LUMBAR VERTEBRA

Posterior displacement of the fifth lumbar vertebra (Fig. 2) was recognized as a developmental anomaly by Ferguson at the New York



Fig 2 Posterior displacement of the fifth lumbar vertebra on the first sacrum, and an acute lumbosacral angle Patent completely relieved of symptoms by a lumbosacral fusion Follow up period 3 years

Orthopædic Dispensary and Hospital in 1924 The patient (No 71821) in whom this condition was first found had a lumbosacral fusion on May 28, 1924 Previously posterior displacement of the fifth lumbar vertebra had been noted in connection with fracture dislocation and also with tuberculosis of the vertebral body However, it was not recorded in the literature from our institution until mentioned by Hibbs and Swift (1929) and Smith (1920) Similar observations were later published in American journals by Williams and I glesias (1933), Ferguson (1934), Johnson (1934), and again by Smith (1934) Under the name of posterior spondy lolisthesis it was described in European literature by Sicard, Haguenau, and Wallich (1928), Perrier (1929) and Junghanns (1930)

Posterior displacement of the fifth lumbar vertebra is commonly found in individuals having low back and sciatic pain. It was demonstrable in the roentgenograms of 235 (203 per cent) of 1,157 consecutive patients who were treated at this clinic for low back.



Fig 3 A transitional fifth lumbar vertebra

and sciatic pain. In nearly all these cases the posterior articulations were either in the coronal plane or nearly so We believe it is one of the developmental anomalies most commonly associated with an unstable fifth lumbar vertebra This condition has been called by Willis an optical illusion However, we have roentgenographic evidence of posterior displacement as great as seven-sixteenths of an inch and must of necessity consider it real A posterior displacement may be acquired in true atrophy of an intervertebral disc from any cause and in fracture dislocations of the vertebral bodies These acquired displacements, when extreme, may cause direct pressure upon the lumbar nerves within the intervertebral foramina. If the intervertebral disc is normal there is no posterior displacement of the inferior articular processes of the fifth lumbar vertebra, conclusive evidence in support of the theory that the posterior displacement of the body is developmental When there is true atrophy of the disc the posterior articulations are subluvated and marked osteoarthritic changes are found at operation



tumoserch anticanions sing a spine unod science may mass corroborated at operation in the intellaminal space mass corroborated at operation in the intellaminal space of home representing the unlage of the spinous process of the fifth lumbar The right intenserse process of the dith lumbar is large but forms no pseudarthous with either the sacrum or titum. Pattert was entirely well 3 years after a spinal fusion of first sacral to fourth lumbar veriebra

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Where the joints are asymmetrical, partial subturation with locking is more likely to take place, accounting perhaps for some cases of sudden onset of low back pain accompanied by a definite snap and for sudden relief from the same pain with a definite snap, either spontaneously or as the result of manipula tion. Subtuvations are sometimes seen at operation especially when there has been some atrophy of the intervertebral disc.

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Fig 6 Spondylolisthesis in a 28 year old man. The defect in the lamina of the fifth lumbar vertebra is plainly visible. Patient complains of low back and scratic pain of 8 months' duration.

coronal plane or nearly so, and an early development of osteophytic lipping Spina bifida occulta is common Unilateral sacralization especially makes motion eccentric. The enlarged transit erse process causes narrowing and lengthening of the lumen of the bony canal through which the anterior root of the fifth nerve must pass, increasing the possibilities of uritation.

EXAGGERATED LUMBOSACRAL ANGLE

The axis of weight-bearing of the body passes anterior to the lumbosacral juncture, causing a constant shearing strain which is proportional to the obliquity of the superior surface of the first sacral vertebra with the horizontal. This angle averages around 43 degrees, but may be much more and sometimes reaches nearly a right angle (Fig. 4). In these cases one often finds at operation a deepening of the posterior articular fosses and the inferior articular facets of the fifth lumbar.

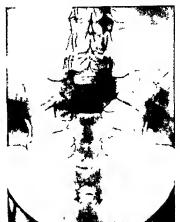


Fig. 7. Spondylolisthesis. This anteroposterior seem shows the shadow of the fifth lumbar vertebra super imposed on the shadow of the first sacral. A lateral seem in the same patient showed the fifth lumbar vertebral body to have slipped completely off the first sacral. This condition was present in an 18 year old girl. Deformity had been noticed for 7 years and low back pain had been present for 2 years. A spinal fusion was done of the fourth lumbar to the first sacral. When last seen 6 years after operation the patient was employed as a casher her fusion mass appeared solid and she was without symptoms. The deformity, of course remained the same

vertebra subluvated into them. An accentuated angle puts muscles and ligaments under great and constant strain, and by reason of the upward displacement of the posterior articular processes of the first sacrum toward the inferior intervertebral notches of the fifth lumbar vertebra the lumbosacral foramina are encroached upon (Fig. 4) This has been demonstrated on the cadaver by Danforth and Wilson and is seen in lateral roentgenograms Likewise, a greater proportion of the superincumbent weight must be borne by the posterior spinal elements, ill prepared to receive it There is an associated narrowing of the posterior portion of the intervertebral disc which, as mentioned by Ferguson, is not an atrophy but merely a



Fig. 8. A narrow intervertebral disc between the fifth lumbar and the first sacral vertebro in a 54 year old female whose complaint was that of low back and bilateral scrate pain of 5 years duration. Note how small the lumbo-acral intervertebral foramen is compared with those above.

phase in anteroposterior motion. This can be demonstrated by taking lateral roentgeno grams in extreme flexion and in extension. Sometimes true atrophy of the disc is present

In 28 European specimens Mitchell found that the average inclination to the horizontal of the upper surface of the first sacral body was 31 degrees and the average inclination of the last lumbar vertebra in the same specimens was 10 degrees. This is one reason why fusing the fifth lumbar vertebra to the sacrum strengthens the spine and lessens muscular and ligamentous strain.

SPOND'S LOLISTHESIS

Spondylolisthesis was described by Herbi neau in 1782. The term derived from the Greek meaning 'gliding of a vertebra' was first used by Killian in 18,2. In 1892. Neugebauer collected 101 specimens showing the deformity. He ascribed the condition to lack of fusion between two centers of ossification existing in each lateral half of the neural arch. It most commonly affects the fifth lumbar (Figs. 0 and 7). Between 1914 and August 1936, 104 patients had a spinal fusion at the

New York Orthopædic Dispensary and Hos pital because of low back pain resulting from this condition. We have found in all these a failure of fusion in the lamina between the superior and inferior articular processes, usually bilateral The osseous portions are connected by fibrous tissue. This has, of course, been repeatedly seen and reported on museum specimens and cadavers and its congenital nature cannot be doubted. As has been pointed out by Willis, no callous forma tion is seen, which precludes fracture. We have one patient of whom rocntgenograms taken in early childhood revealed a defect in ossitication of the lamina of the fifth lumbar vertebra without slipping (prespondylolis thesis) and another series of roentgenograms of the same patient taken several years later showing a marked anterior displacement of the vertebral body. Anterior slipping prob ably is more often due to gradual stretching of the fibrous defect in the lamina rather than

sudden rupture Sixty two patients having spondylolisthesis and one having prespondy lolisthesis (Figs 4 and s) were found among the 800 treated for low back pain in this clinic during 1934 This represents new patients received during the year and "hold overs" from preceding years However, in 1,157 consecutive new patients entering the clinic with low back and sciatic pain, 3 had prespondy lolisthesis and 4.1 spon dylohisthesis a combined percentage of 4 r Willis reported congenital defects in the neural arches in 4 28 per cent of 748 skeletons in a comparable racial group. It is surprising to see that the apparent combined percentage of prespondylolisthesis and spondylolisthesis in individuals having low back pain is no higher than the average incidence for this congenital defect. On a few occasions we have found at operation a fibrous defect in the lamina be tween the superior and inferior articular processes that had not been observed in roentgenograms of that area This failure to detect by roentgenogram all cases of this defect may account for its apparently low incidence in patients having low back pain

As demonstrated in the dissecting room and at operation the posterior elements of the defective vertebra are underdeveloped, hypermobile, and the attached ligaments attenuated so that they are poorly prepared for the mechanical disadvantages associated with anterior displacement of the vertebral body. An exaggerated lumbosacral angle and spina bifida occulta are commonly found with spondylolisthesis.

DEGENERATIVE CHANGES IN THE LUMBAR SPINE

The spine is one of the first organs of the body to show the degenerative changes of increasing tissue age. These changes are most manifest in the lumbar spine, particularly at its junction with the sacrum, and it is here, for reasons already stated, that anatomical changes are most likely to cause symptoms. Lessened elasticity is one of the earliest degenerative changes coming in the normal life history of the intervertebral disc. This magnifies the mechanical shocks to which the bony surfaces are exposed.

In 3,000 routine examinations of the spine at autopsy, Schmorl found fissuring of the cartilaginous plates allowing hermation of the nucleus pulposus into the spongiosa in 38 per cent. This, of course, narrows the intervertebral discs (Fig. 8) in addition to decreasing their shock-absorbing power. The narrowed discs disturb the relationship of the articular surfaces of the posterior joints, and osteoarthnits results.

Beadle writes that hermation of the disc substance posteriorly into the spinal canal was found in 152 per cent of 368 spines. None was seen under 30 years of age and most were in individuals over 50. He does not mention what percentage of these occurred in the lower lumbar spine.

That such a condition could cause scatter and low back pain was first mentioned in this country by Goldthwait in 1911, and almost simultaneously by Middleton and Teacher in Scotland Their work has lately received ample confirmation by Mixter and his co-workers, who have reported operating upon 23 patients in whom a hermation of disc substance posteriorly had been accompanied by scattica and low back, pain All but one obtained immediate and complete relief from scattica when the offending hermation was

removed The follow-up period has been too short to testify as to the permanency of the relief The age, history, and physical findings differed in no way from what one commonly finds in patients having a severe so called lumbosacral strain or unstable fifth lumbar vertebra All, however, had an elevation of spinal fluid protein and most a definite shadow defect after injection of lipiodol into the subarachnoid space There have been more recent reports of intervertebral disc herniations unaccompanied by an elevation of spinal fluid protein, but an elevation is much the more common finding, being present in 36 of 30 recently reported cases (Hampton and Robinson) The only other significant roentgenographic finding was a thinning of the intervertebral disc at the level of the lesion in 5 of the 23 patients At operation the disc protrusion was found between fourth and lifth lumbar, 15 times, fifth lumbar and first sacral, 5 times, third and fourth lumbar, twice, and first and second sacral, once Posterior herniations of the disc between the fourth and fifth lumbar usually press directly upon the fifth lumbar nerve root This lesion is not uncommon, for in 18 months 12 cases were seen and patients were operated upon at the Massachusetts General Hospital

DIAGNOSTIC SPINAL PUNCTURE IN LOW BACK PAIN

It was with the work of Mixter and bis colleagues in mind, and with the hope that more light would be thrown upon the etiology of sciatica and low back pain, that now all patients entering the New York Orthopædic Hospital for operative work because of this condition have a spinal fluid examination Particular attention is paid to the protein content In 12 of the first 50 patients it was found to be above the commonly given upper limit of 42 milligrams per 100 cubic centimeters for the metbod used In one the reading was 100 milligrams per cubic centimeter and the globulin was 2 plus This turned out to be due to a cord tumor and will be discussed later In 11 the protein varied from 43 to 64 milligrams and averaged 50 The spinal punctures were done between the third and fourth lumbars In Mixter's cases, with proved disc proby anatomists for the buttocks and lower extremities

It has been established that motor nerves can possess protopathic sensations so that stimulation of such a nerve causes a definite, diffuse, and ill defined pain. A simple ade quate evplanation for that major portion of sciatica and its accompanying phenomena not explainable on a referred basis is that irrita tion of the fifth lumbar nerve in its interverte bral foramen, or in the spinal canal, causes a neuritis, lowers its thresbold to stimuli, and sends protopathic sensations out along its motor branches Sensory branches within the nerve which go to the lateral aspect of the leg are also stimulated, accounting for the more superficial nature of the pain and the occasional sensory changes in that area If stimuli are strong enough they may spill over into the other branches of the sciatic nerve, result ing in such a phenomenon as pain in the

lateral plantar aspect of the foot After leaving the intervertebral foramen the posterior division of the fifth lumbar nerve turns backward and divides into branches which supply the lumbosacral articulations, supporting ligaments and muscles, and enter into the posterior sacral plexus along with the sacral nerves. While in the intervertebral foramen it is subject to the same irritation as the anterior division which forms part of the sciatic nerve Another source of irritation is the lumbosacral joints and their supporting muscles and ligaments That these things may be so is suggested by the disappearance of pain in this area on fusion of the fifth lumbar vertebra to the sacrum Pull of a spastic gluteus maximus upon its origin from the posterior sacro iliac and sacrotuberous ligaments supplied by the posterior sacral plexus, may be a third source of pain This is demonstrated by the sudden relief from this as well as sciatic pain which may follow a posterior Smith Petersen incision (Heyman)

DIAGNOSIS

The symptom complex often designated as "low back trouble" occurs most commonly between the years 20 and 50 In 600 consecutive patients entering our dispensary with this complaint the average age of the females was

35 and of males 37 Most of these patients had had symptoms for several years Among females many dated their trouble as coming on during pregnancy or following childbirth Both sexes were wont to have their mitial symptoms in that decade between 25 and 35 years when muscles begin to lose their tone. yet the individual fails to appreciate that he can no longer go suddenly from his now more sedentary ways into strenuous physical efforts without suffering the consequences Others may not develop symptoms until about the fifth decade of life when degenerative changes such as osteo arthritis so often become clini cally noticeable In this group of 600, 42 were less than 20 years of age and only 18 over 60 A disproportionate number of the former had spondy folisthesis, a condition which may produce a noticeable deformity sufficient to cause the patient to seek medical counsel even be fore symptoms appear Females slightly out numbered males in this group, most writers,

however, report more males than fumales A single definite traumatic accident may initiate symptoms, but more often the onset is insidious with exacerbations following severe or sudden back strain. First symptoms are usually muscle fatigue and an ache in the low back area radiating out over the sacro iliac joints and into the buttocks Back stiffness is a morning complaint, and low back pain is experienced on sudden unguarded movements or spinal movements of consider able range Lifting, coughing, and straining are painful. In many backache is accentuated by the presence of a focus of infection else where in the body and in some by damp weather Menstruation in women and chronic inflammatory conditions in the pelvic region may increase the pain The patient feels best when lying on a firm, unsagging surface Sciatica may not be present at the onset Occasionally, however, it is the only symptom and it is the common finding in severe and chronic cases A lateral list of the trunk (scratic scoliosis), either contralateral or ipso lateral, may be present. The former is twice as common as the latter A description of the symptoms and signs in the lower extremity has already been given Pain in the lower extremity may be accompanied by a con

tracted tensor fasciæ latæ sufficient to cause

an abduction deformity of the hip

This syndrome is found in both active and sedntary people and in all types of body build, but is more common in those of herbivorous build, probably because they are more subject to lumbosacral anomalies and decenerative ebanges in the spine

Poor posture is a common finding, especially when the patient is of the slender type Lumbar lordosis is variable, being entirely eliminated in some acutely painful backs, whereas more chronic cases may show increased lordosis. Motion of the lumbar spine is limited, as a rule, by pain and muscle spasm Tenderness may be present in the illosacrallumbar angle, over the fifth lumbar spine, and most commonly in that area under which lies the origin of the gluteus maximus muscle, the posterior sacro-iliae ligaments, the joint itself and the posterior sacral nerve plexus

Tests that produce motion in the lumbosacral joints cause pain as a rule Lascgue's sign stretches the sciatic nerve The only so called sacro-iliae tests which do not move the lumbosacral joints too are springing of the joints by compression of the iliac wings, and pressure over the symphysis pubis

DIFFERENTIAL DIAGNOSIS

Primary myofascitis Probably prolonged irritation of the sciatic nerve will produce a myofascitis in the muscles supplied by it Certainly tenderness on squeezing the calf muscles is a common finding in individuals baving sciatica but no apparent focus of infection or an arthritic diathesis

However, one often finds a patient who was symptom free until he developed an acute infection such as tonsilluts. He then had back pain and sciatica, accompanied by fascial and muscle tenderness in back, buttock, and thighs, which cleared up shortly after elimination of the acute focal infection. Here is a case of toxins making their presence known at the point of least resistance. Such a patient may bave an unstable lumbosacral mechanism whose reserve margin has been broken down by the addition of a toxic load. It is more helpful to think of the latter group as cases of primary myofascits and concentrate one's

efforts on the elimination of the infectious process

Fascial planes may be likened to joints allowing muscles to glide. If actual inflammation exists between these surfaces adhesions form causing pulling upon nerves which pass through the fascia into the muscle. Hence a chrome myofascitis quite resistant to treatment may develop. Patients so afflicted are poor subjects for spinal fusion even though their condition is aggravated by an unstable fifth lumbar vertebra.

Spondylitis ankylopoietica (Marie-Strumpell type) This is a disease which in its early stages consists of an inflammation of the posterior articulations and lighments of the spine Later they undergo ossification Golding has well shown that even before there is roentgenographie evidence of involvement of the vertebræ such evidence is present in the sacro-iliae joints. Two of the 681 patients upon whom spinal fusions were done for an unstable fifth lumbar vertebra at the New York Orthopredic Dispensary and Hospital later went on to develop this type of spondylitis At the time of fusion they were young adult males with history and physical findings typical of that commonly associated with an unstable fifth lumbar vertebra Examination of the pre-operative roentgenograms did, however, show arthritic condensation of the sacroiliae joints and a slight furring of the lumbosacral joints The above story, plus a history of transient synovitis of some of the joints of the extremities several years previously, are the common early findings Later in its development this disease presents a typical picture easy to diagnose correctly

Osteo-aribritis As previously stated, this condition is one of the causes of low back and sciatic pain. When localized to the lumbosacral area the treatment differs in no way from that to be outlined. If generalized osteo-arthritis of the spine exists, treatment, particularly operative, must undergo drastic modification. Roentgenograms and the presence of generalized back pain make diagnosis of this condition simple.

Sacro-iliac strain As early as 1863 Hilton wrote that sciatica might be caused by sacro-iliac or lumbosacral disease and that differen-

tiation of the two conditions was almost im possible. He described typical cases of low back and sciatic pain which he attributed to disease in the sacro line joint. He treated them by rest much as it is done today.

In 1905 Goldthwait and Osgood stated that this syndrome might be due to sacro thac relaxation, subluxation, or arthritis conception of the etiology became extremely popular and still has its adherents. Some feel that sciatica is referred pain from the ligaments of the sacro iliac joint, others that the fourth and fifth lumbar nerve trunks are irri tated as they lie in close proximity to the anterior aspect of the joint. Earlier in the paper reasons for believing that sciatica is only in small part, if at all, a referred pain are given We have case records in which a large abscess forming over the anterior aspect of the sacro iliac joint, secondary to tuberculosis or osteomyelitis within has caused sciatica However, even assuming that a minute subluxation of the sacro iliac joint takes place, it is difficult to believe it would irritate the lumbosacral cord, which is held loosely attached to the anterior aspect of the sacral body with its fourth lumbar root, and occa sionally the fifth lumbar, lying over only the inferior angle of the joint (Danforth and Wilson)

The sacro iliac joints allow but a few degrees of rotary and sliding motion and have the strongest hgamentous support of any joints in the body. They are made for stability, not mobility. It is hard to concerve of low back pain being the result of ligamentous strains or minute subluxations at this joint Such a conception is particularly difficult to entertain when one sees tuberculosis chronic arthritis, or gross subluvation of a sacro iliac joint following severe injury unassociated with a great deal of pain. It is surprising that the symptom complex just discussed should be attributed to strain of these joints when in their immediate vicinity a mechanical set up exists which theoretically can readily account for the symptoms produced Probably be cause non-operative treatment devised for sacro iliac strain is of equal therapeutic value for lumbosacral strain, and the various diag nostic tests aimed at eliciting symptoms in

one are almost as effective in producing symp toms in the other, the misconception has been long lived

In operative fusion of the sacro iliac joint the posterior attachments of the gluteus maximus and deep fascia are usually widely stroped from the posterior iliac crests. Her man has found that this procedure alone will sometimes give a complete cure from sciatica Bed rest, immobilization and physiotherapy, which accompany operative treatment, have also proved beneficial in low back pain, hence the fallacy of sacro iliac strain has not been as quickly exposed as it might have been. The writer does not consider pain to be of sacro thac origin unless there is evidence of disease or gross displacement of that joint depth, obliquity, irregularity of joint surfaces, and overlying shadows make any roentgeno graphic interpretations difficult and subject to a large margin of error

a large margin of error Coccept of may cause lumbosacral injunes also Perhaps because of this man, have felt that pain due to an unstable fifth lumbar vertebra may be referred to the coccey. This has been dis proved as a result of the careful studies of Duncan. On several occasions lumbosacral (usions base been done at this hospital for a combination of symptoms from these two conditions. The low back and scatte pain has disappeared but the coccy godyma has remained until finally cured by coccygectomy.

Coccygodynia is usually accompanied by a definite history of direct trauma to the coccy v Males are seldom afflicted as their narrow sacrosciatic notches permit the coccyx to he tucked in between the ischial tuberosities, and to be protected from falls in a sitting position Pam is worse when sitting or on rising from a sitting posture. It is lessened by sitting on an air cushion ring or contracting the gluter while sitting erect, thus raising the coccyx off the chair External and rectal palpation will reveal tenderness, and there may also he m creased mobility and angulation of the coccy on the sacrum When arthritis is present at the sacrococcy geal joint minor traumas often cause coccygodynia Roentgenograms may show an unusually long or unprotected coccyt, osteo arthritis, acute angulation and, more

rarely, a fracture dislocation Variation in the number of cocygeal vertebræ, and a transitional first cocygeal vertebra are common

Fractures of the spine Compression fractures of the vertebral bodies and fractures of the transverse processes or posterior elements of the spine occasionally produce a syndrome resembling that of lumbosacral strain Roentgenograms and bistory should enable one to differentiate the two

Spinal cord tumors Spinal cord or cauda equina tumors are the most difficult problem in the differential diagnosis of low back, pain If the patient's pain is greatest when recumbent, even if on a firm unsagging surface, is particularly accentuated by coughing or pressure upon the internal jugular veins, and both sensory and motor disturbances are present, cord tumor must be suspected If a tumor is present there will be an increase in spinal fluid protein, a complete or partial block, and a defect in the lipiodol shadow.

While low back pain in the majority of patients is satisfactorily explained by the mechanical and degenerative changes just discussed, it must be remembered that a similar syndrome can be produced by infectious diseases and new-growths involving the lumbosacral area of the vertebral column Symptoms in these cases are caused by infammation and toruc absorption as well as the mechanical disturbance produced. Tuberculosis, chronic osteomyelitis, and metastatic tumors particularly must be kept in mind. These should not be difficult to rule out if the examination has been thorough and roent-genograms taken.

Prostatitis and vesiculitis in the male, malposition, new-growths, and inflammatory conditions in the pelvic organs of the female, and rectal pathology in both seves must be considered. A differential diagnosis of these conditions is not within the scope of this paper I do not believe that the picture of low back pain and sciatica is commonly caused by intrapelvic pathology.

NON-OPERATIVE TREATMENT

A Mild cases Exercises designed to improve body posture and to strengthen the muscles of the lumbar spine and abdomen are beneficial Exercises should not be carried to the point where strain and its accompanying symptoms are produced, and for this reason they are impractical while symptoms are severe Patients are to be cautioned against activities that cause back pain Women addicted to high heels should replace them with low heeled shoes because of the adverse action of the former on general body posture

Heat followed by massage is helpful For economic reasons it is well to instruct the patient and some other member of the family in the manner this should be carried out so that they may do it at home daily

Elimination of bed sag by placing a fracture board between the mattress and bed springs is of great value and, next to postural exercises, gives more relief than any measure to be considered when symptoms are mild

Foci of infection in all cases should be searched for and, if possible, eliminated

B Cases of moderale severity Tbese patients should, in addition to the above treatment, be given a supporting belt, corset, or brace. It is to be noted that while providing much relief from back pain, external supports seldom lessen sciatica to as great a degree. In women a stiff corset containing little or no elastic, to which has been attached a back pad to fit into the "small" of the back, is satisfactory. Men may be supplied with a lumbosacral belt having a similar back pad. The belt should be 6 or 7 inches wide for an adult and have perineal straps.

For patients having considerable pain or an accompanying generalized spinal arthritis, a light Taylor back brace gives more support If arthritis is confined to the lumbar spine a brace about 11 inches in height is sufficient, but if the dorsal spine is also involved it should extend from the buttocks to the first dorsal vertebra

External supports should be discarded gradually when severe symptoms disappear, for if prolonged they weaken the very muscles that support the lumbar spine

C Science cases If the onset of pain is acute, recumbency on a firm bed, with a brace such as described applied to the back, and, if sciatica is present, adhesive moleskin traction to the legs, is indicated Daily baking and

light massage should he given Sedatives are sometimes required

Much the same treatment is applicable to chronic cases if operative work is contraindicated or refused

Prolonged suffering which has failed to respond to treatment leads, in many patients, to the development of anxiety tension syndromes and neuroses. For such, a full explanation of their condition plus positive assurance that they can be made well, when combined with effective treatment is helpful Symptoms are likely to be exagerated and convalescence prolonged in patients receiving compensation. This is particularly true in the older and the less ambitious and must be considered in any plan of treatment.

Epidural injections. We have not found epidural injections of novocain of sufficient value to warrant their continued use

Manipulations Forceful manipulations of ten harm and are never warranted. Manipulations may be used routinely when gently done. One seldom sees a dramatic cure but often the patient's suffering is temporallaly allayed. It is probable that some who are given rehef have had a subluxation of one or hoth posterior articulations which have slipped back, in place during the maneuvers.

OPERATIVE TREATMENT

Tensor fascia lata fasciotomy In 1020 Percy W Roberts of New York, found that sciatica could be relieved by releasing the tensor fasciæ latæ glutcus medius, and the anterior portion of the gluteus maximus from their origins and allowing them to slide down and re attach at a lower level on the ilmm He did not publish his results. In February, 1034, Ober cut the lascia tensor over and adjacent to the tensor fascile later muscle and found it relieved the patient of low back and sciatic pain in a fair percentage of cases having what he considered a contracted fascia. The test devised by Ober to detect contracture of the iliotibial band and fascia lata and his operation for correction of the condition, are described in articles by him (24 25)

Our incomplete knowledge makes it difficult to say what is or what is not normal fascia in the living adult. Certainly it varies a great deal in thickness and tautness from individual to individual. Likewise, the number and size of intermuscular fibrious bands extending from the fascia is variable. Generally the fascia is most taut and thick over the anterior portion of the tensor fascia late. After severance the cut edges of the fascia spread from r to 2 inches. In our cases the fascia when examined microscopically has appeared normal.

No satisfactors explanation has been given as to why a fasciotomy sometimes bringrelief from scratica and low back pain. We know that many patients have had partial relief from a fasciotomy and then complete relief on doing a lumbo-acral fusion, the reverse is also true. Lumbosacral fusion cures completely and permanently a much higher percentage than does fasciotomy. However, there are cases such as this A 24 year old man entered our hospital with an extremely painful low back and left-sided sciatica and an ipsolateral list of the trunk. Roentgenograms showed a posterior displacement of the fifth lumbar vertebra. A lumbo-acral fusion gave complete rehef and he returned to his work as a house painter 4 months after opera tion Three vears later he had a sudden onset of right sciatica and low back pain and again an insolateral list of the trunk Non-operative measures pursued for several weeks did not help at all Anght fasciotomy was then done, relief was immediate and the patient was still symptom free 11 months after operation There are no clear cut signs which tell us that this patient's symptoms are due to a tight fascia and will be relieved by a fasciotomy or that another patient's symptoms are due to an unstable fifth lumbar vertebra and will be cleared up by a lumbosacral fusion Ober test is often positive in individuals who have never had sciatica and is particularly likely to be so in people of herbivorous build of middle age or beyond. It may be positive after a spinal fusion that has cured the patient completely and may remain politive even after a fasciotomy that has had the same happy ending. When sciatica is unilateral it is, however, usually more positive on the in unliked side. The writer has seen patients with sciatica and a strongly politive Ober sign both of which have disappeared completely in

the course of 1 or 2 weeks of non-operative treatment Releasing the gluteus maximus from its attachments to the posterior aspect of the sacro-ihac joint and ihac erest will free one of sciatica much as a fasciotomy does Signs such as an absent Achilles reflex, positive Lasegue's test, tenderness and muscle atrophy may disappear, as well as symptoms, following a fasciotomy

From these facts one can assume that the Ober sign is not necessarily positive because of a tight fascia but may be due to muscle spasm Certainly fascia is not tissue that can contract in a few days, then return to normal in a few more days, and that is the supposition one would have to make in ascribing to it the Ober sign When muscle spasm and therefore shortening has existed for a long period of time and bas been accompanied by inflammation, one can conceive of fascia undergoing actual contracture Since inability to adduct the thigh, and a fascia that feels definitely tight may be present even when sciatica is not, one cannot place a great deal of reliance in the Ober test

A fasciotomy lessens the tension of the gluteus maximus and fascial covering by allowing origin and insertion to follow more nearly a straight line course. One ean conceive of this affecting sciatica and low back pain in three ways, and perbaps all three play some part in the picture (r) strain upon the lumbar spine becomes less, (2) tension exerted upon the origins of the gluteus maximus and fascia lata is decreased, (3) any pressure which a spastic gluteus maximus muscle might impose on the underlying sciatic nerve is lessened. Whether this is the manner in which a fasciotomy interrupts the mechanism by which pain is produced is conjectural However, I believe that one must still look to the lumbosacral spine to find the primary etiological factor in this syndrome

Up to September 1, 1936, this operation had been done upon 70 patients at the New York Orthopredic Dispensary and Hospital In 9 the fasciotomy was bilateral, and in 2 it was repeated because of failure to obtain rehef at the first operation These patients varied in age from 14 to 80 years Forty

TABLE I -TYPE OF LIST AND RLSULT OF

0.	DIGITIE		_	_	
	Direction of trunk list				
	lpso lateral	Con tra lateral	Alter nating	Total	Per cent
Complete or more than 90 per cent relief	,	4	2	8	38
75 per cent relief		4	0	4	19
50 per cent relief	3	0	0	3	14
Less than 25 per cent or no rehel	1	5		6	29
Total number of patient	6	13	2	21	

were females, averaging 36, and 39 were

males averaging 39 years of age

All of the patients had severe sciatica which had not proven amenable to non-operative treatment. In 34 the sciatica was on the right side only at the time of operation, in 30 on the left, and in 15 it was bilateral. However, in the latter pain was usually much worse on one side than the other. The length of time symptoms had been present varied from 4 weeks to 23 years and averaged 4½ years. Fifty-seven of the 79 patients had fatigue or fatigue and pain across the back at and above the level of the lumbosacral junction in addition to sciatice.

Twenty-one (27 per cent) of the patients had a definite list of the trunk, so called sciatic scoliosis. The type of list and the operative results in this group are shown in Table I.

A comparison of these results with those listed in groups I and II below shows no significant difference in the results obtained Theoretically this might seem a favorable group, as in them the Ober test is more likely to be strongly positive

Excluding all patients who had not been followed for more than 2 months, the re-

mainder were divided into a groups

Group I These patients had only a fasciotomy The average follow-up period was 8 months. In this as in the other groups, when rehef was obtained it sometimes came with dramatic suddenness, but more often while considerable immediate diminution in pain was obtained several weeks elapsed before it was completely gone. Sciatica usually disappeared before back pain. Occasionally

TABLE II -- INVOLVEMENT AND RESULTS

		tica ny	Scratica and back pain	
	10	Per cent	No	Per ernt
Complete or more than 90 per cent rel ef	6	67	7	23
Complete relief from sciatica but still some back pain	•		5	24
50 to 75 per cent relief	1	22	6	29
Less than 25 per cent or no rehef	2	22	1	14
Total number of patients	•	_	35	_

the former would disappear completely and the latter remain. More commonly both were lessened, but the disappearance of back pain would he less complete and would take longer

would he less complete and would take longer Analyzed in another way, in the entire group 13 (43 per cent) were well, 12 (40 per cent) had at least 50 per cent rehef from symptoms, and 5 (17 per cent) were not mate really improved (Table II) These results are quite similar to those of Ober, who in 42 patients reports 23 (55 per cent) as well, 10 (42 per cent) as improved, and 9 (21 per cent) as unimproved. However, our results are not as sanguine as this group might indicate, for in the analysis one must consider at least the 5 patients in group III in whom a period of 1 month elapsed before the spinal (uson).

Of special interest in this group is one patient who had a fasciotoms on one side with complete relief, but 1 year later returned with sciatica on the opposite side. This, too was completely cleared up by a fasciotomy.

Several of the failures in this and the other groups had some relief immediately after the operation, but symptoms returned as soon as they again became active

Group II There were 20 patients who previously had had a spinal fusion, and mone case a sacro ihac fusion too, for rehef from scattica and hack pain. In some the fusion had been done several years previously hut more often but a few months had elapsed. In all of the cases shown in Table III, however, at least 2 months clapsed hetween the spinal fusion and fascotiony. The average follow up period since fascotiony the areas follow up period since fascotiony the areas follow up symptom after fusion was scattica only

TABLE III - RESULTS IN GROUP II

	Lulateral	Bilateral	Total	Per cest
Complete or more than go per cent rel el	1	1	5	25
50 to 75 per cent relief	7	,*	8	40
Less than 25 per cent or no relief	4	3	7	35
Total number of patients	15	5	20	

Thus patient had a bilateral fasciotomy with complete relief on one side some on the other. The latter was repeated four months later with a repetition of the failure. She has a definite pseudarthrous in her spine has the same of the failure.

Of the 7 failures, one did have complete rehef for 6 months, then a recurrence. His fusion has been explored and found solid. A complete sectioning of the pinformis muscle has also failed to bring relief from pain (Frie burg). In another patient symptoms returned suddenly after an absence of 16 months. Two had pseudarthroses repaired later and have obtained complete riddance of pain. One other has a definite pseudarthrosis clinically and by roentgenogram but has refused an

attempt at repair
Group III In this group the fasciotomy
was accompanied or followed by a spinal
fusion In 3, the operations were simultaneous
and while all are well, one can draw no con
clusion as to which procedure had the curative
effect. The others are tabulated in Table IV

Six of the above 9 patients have been seen at least 5 months after spinal fusion (first sacral to fifth lumbar). Four are symptom free while 2 have had no appreciable rehef One of the latter has recently had a pseudarthrosis repaired.

Lumbosacral anomalies present in this series of patients were essentially the same as those in which we have performed spinal

TABLE IN --- RESULT FROM F 4SCIOTOM'S,
GROUP III

		Spinal fus on within one month after lasciotomy	Spinal fusion s to s3 months after fasciolomy Average period s months
Relief from scratica but not	back		
pan		1	1
Partial relief from sciatica	попе		
from back pain		1	2
No relief		2	2
		-	-
Total number of patients		4	5

fusions except that none had spondylolisthesis. The lumbosacral angle was variable, ranging from 5 to 64 degrees and averaging 35 degrees. More often than not the angle was materially decreased by lumbar spasm and again increased after fasciotomy. Twenty-one (27 per cent) of the patients had roent-genographic evidence of arthritis elsewhere in the body, mostly the spine. It is doubtful whether this is greater than the average in any group of people of this age. However, patients with arthritic spines, while getting as much relief from sciatica, were less likely to get ind of back pain than the non-arthritics.

Significant is the fact that patients who had had sciatica for less than I year obtained far better results than those in whom symptoms had been present for a longer period. In this group were 17 patients. Eleven (65 per cent) obtained complete rehef, in 2 (12 per cent) sciatica disappeared but back pain remained, 2 (12 per cent) were 50 to 75 per cent improved, 2 (12 per cent) unimproved. These were patients included in groups I and III.

SUMMARY

- r The ideal patient upon whom to do a fasciotomy is one whose predominating symtom is sciatica which has been present for less than 1 year and who shows no roentgenographic evidence of generalized spinal arthritis
- 2 There are, however, patients with too extensive spondylitis to justify a spinal fusion in whom a distressing sciatica exists which has failed to respond to non-operative measures. The percentage of these patients who are relieved entirely or in part of their sciatica by a fasciotomy makes it a warrantable procedure.
- 3 The simplicity of this operation, its minor nature, and the fact that it can be done under local anestbesia make it applicable in many patients whose age and health contraindicate major operative procedures. Likewise, the short period of hospitalization (if week) and disability enables one to perform a fascotomy on patients who cannot afford to be economically shelved for the 3 to 5 months required by a spinal fusion
- 4 I believe that anyone who has had low back pain and sciatica to a disabling degree,

as the writer has, will agree that a fasciotomy is worth while if only 50 per cent relief is obtained. In group I, that had this operation alone performed, 83 per cent were benefited that much or more.

5 The results of this operation are not as satisfactory as those of lumbosacral fusion, an operation that has well stood the test of time

SPINAL FUSION

Fusion of the lumbosacral spine is done on the theory, now amply proved, that complete elimination of motion will cause cessation of inflammation existing in and around the articulations and intervertebral foramina and relieve supporting muscles and ligaments of a strain they have been unable to bear. We also believe that direct pressure does not produce a radiculitis when motion is not produce a radiculitis when motion is not present. The remarkable ability of soft tissues to make an adjustment between themselves and their surrounding bony canal after changes caused by tuberculosis and spinal fractures has often been observed at autopsy

The first spinal fusion performed at the New York Orthopædie Dispensary and Hospital to relieve a patient of low back and sciatie pain was done in 1914 upon an adoleseent girl having spondylolisthesis From that date until August 1, 1936, this operation was done upon 681 patients Three of these patients died, a mortality rate of o 4 per cent In 2 of the patients death was due to a Streptococeus hæmolyticus septicemia secondary to wound infection. One death followed a postoperative pneumonia In general the postoperative course of the patients has been as uneventful as one might expect of a elean appendectomy case in the average general hospital The patients are recumbent for 6 to 8 weeks, wearing a Taylor back brace extending from the buttocks to about the tentb dorsal vertebra Absolute immobilization of the spine by external means is impossible but a brace does prevent the more gross movements After getting up activities may be increased gradually until the brace is discarded about 4 to 5 months after operation A patient should be able to return to scdentary work within 3 months and to manual work within 4 to 5 months after operation

The Hibbs type of spinal fusion which was used in all cases is too well known to require further description. However, it might be well to emphasize the following points (1) It is essential that the cartilage from the posterior articulations be removed and the resultant spaces packed with bone chips (2) The chips should be numerous and small. The smaller chips increase surface area, thereby hastening decalcification and revasculariza Also motion between individual particles is decreased. Here as elsewhere this is an important factor in insuring early and solid bony union (3) Usually sufficient bone is obtained if one goes well up on the sacrum and uses the spinous process of the vertebra above the fusion area for additional chips However, if the supply of bone seems madequate, more may be obtained from the posterior crest of the ilium (4) The posterior articulations immediately above the area to be fused must not be exposed as this may lead to a traumatic arthritis (5) Care should be taken to see that the fusion mass does not impinge upon the lamina and spinous process

of the vertebra above Before 2028 the fusion area usually extended from the first eacral to the fourth lumbar vertebra Today for reasons to be shown later in this paper the fusion is of the fifth lumbar vertebra only to the sacrum, unless a spondylolisthesis or very definite degenerative changes or mechanical abnormalities exist between the fourth and fifth lumbar vertebra Likewise, since about the same time we have routinely taken the spinous process of the vertebra above to reinforce the fusion area Still more recently we have been using bone from the posterior crest of the ilium whenever the posterior spinal elements seem inadequate as a source of bone chips For these reasons, and because today more care is shown in the selection of cases, our results are now better than is represented in the end result study gar en belon

It is difficult to get adequate follow up examinations on private patients, so only ward patients have been included in this study All have been followed for a minimum period of 3 years. Many will have or casional aches for 3 to 9 months after operation, then are completely free of symptoms Others may be well for a period of several years, in 2 cases 10 years, then have a sudden recurrence Roentgenograms of the latter will usually sbow a pseudarthrosis It is well known that under non-operative treatment this syndrome commonly follows a wave like course with periods of relative quiescence. For these reasons I believe that 3 years is an absolute minimum period in which to follow a patient before drawing a conclusion as to the worth whileness of this operative procedure

An attempt was made to determine the end results from non-operative treatment but the difficulties encountered in Leeping contact with patients no longer having symptoms were 100 great to make this practicable. The literature contains no adequate statistical studies of the results obtained from non operative treatment of this condition long as we must base opinions on impressions we are seldom in a position to advise spin-il fusion before an effort has been made to secure relief by other means At present about 1 in 15 patients treated at this dis pensary for sciatica and low back pain has a lumbosacral fusion, and it is perhaps idvised in I out of to It is well to remember when judging end results from spinal fusions that these were patients who had had severe symptoms. Many were unable to carry on their work, all were definitely handicapped All had tried non-operative measures to secure relief. Many had been under the care of irregular practitioners as well as legitimate physicians and surgeons All still suffered so much that they were willing to undergo a major operation and time-consuming con valescence in an effort to obtain a cure

In this group are 195 patients who were followed for an average period of 5 years and 11 months One hundred and seventeen were males and 78 females averaging 32 and 29 years of age, respectively The extreme range of ages was 11 to 54 years The length of time symptoms had been present before operation varied from a few weeks to 20 years and aver aged 51/2 years. It is to be noted that the age average in this group is considerably below that for patients treated without operation or by means of a fasciotomy

One hundred and thirty-eight (708 per cent) obtained an excellent result. By this is meant that relief was complete or symptoms were confined to an occasional ache such as any one might have following prolonged physical effort Usually a patient had some backache and occasional twinges of sciatica for 3 to 9 months after the operation These postoperative aches are probably due to the prolonged period of bed rest and back immobilization or to secondary fascial adhesions and other inflammatory changes remaining after the primary causative factor has been removed Nine of the patients had some roentgenographic evidence of generalized spinal osteo-arthritis, but in none were the symptoms from this source more than mild

Fourteen (7 2 per cent) of the patients had 75 to 90 per cent relief, and this might be considered a good result. In analyzing this group n an effort to find why relief had not been complete, the following facts were disclosed

a In one the fusion mass impinged upon the spinous process and vertebra above the fusion

b In 4 patients pseudarthroses existed clinically and by roentgenogram

e One patient had generalized migratory

d One was an extreme neurasthenic, a diagnosis one dislikes to make but probably correct and the cause of continued symptoms in this case

e This man had a markedly shortened lower extremity and recurrent chronic osteomyelitis of the femur. He was of poor physique and posture

f There were 6 patients in whom no apparent reason for the incompleteness of relief was discovered

Seventeen (8 7 per cent) of the patients had a 50 to 75 per cent lessening of their preoperative symptoms Analyzing this group it was found that

a Five had pseudarthroses clinically and by roentgenogram

b Two more had had pseudarthroses repaired but did not obtain complete relief

c This man had a wound infection which drained for 15 months

d Three patients had generalized spinal and sacro iliac arthritis. One of these was

completely relieved 5 years later by a fasci-

e This man had a chronic prostatitis and

an extensive pyorrhea

f Several abscessed teeth were removed
from this patient some years after operation
He complained of generalized joint aches and
pains

g In 4 patients I could find no apparent reason for the incompleteness of their relief

Twenty-six (13 3 per cent) of the patients had little or no relief As far as one can determine none of the patients was made worse Of the 26 patients

a Two had pseudarthroses clinically and by roentgenogram but refused repair

b Nine had attempts made to repair their pseudarthroses This group is described in more detail later

c One woman should bave had the fourth lumbar vertebra added because of an extremely acute angle and oblique articulations Sbe was an extremely nervous individual and inclined to neurasthema

d Nine patients had generalized spinal and sacro-liac arthritis, often accompanied by obvious foci of infection such as teeth,

sinuses, throat, and prostate

e This patient had a tuberculous infection involving the intervertebral disc between the fourth and fifth lumbar vertebræ. This point of infection was not visible roentgenographically until several months after operation. The fusion was then extended to the second lumbar vertebra. The patient is symptomless today. In the 68z patients there were 2 others in whom a similar mistake was made.

f A woman whom several neurologists have diagnosed as having an adhesive arachnoiditis

g A man who later developed a typical spondyhtis ankylopoietica of the entire spine

h It is now obvious that this patient's symptoms came from his dorsolumbar spine, where osteo-arthritis and a slight structural scohosis evisted, and there was no indication for a lumbosacral fusion

1 This patient was completely freed of his symptoms several years later by a fasciotomy No reason for the failure of the spinal fusion was apparent The presence of generalized arthritis and of foci of infection has been listed as a reason for failure to obtain complete cure following spinal fusion, though the writer is well aware that he has not definitely proved that these are causative factors. But in view of the relative absence of these factors in those oh taining complete relief he feels that it is logical to assume that they are major reasons for the continuance of symptoms in the presence of a solid fusion.

From this analysis it can be seen that where one has not relieved a patient of his low back symptoms and sciatica, the patient has nearly always heen ill chosen or a definite pseudar throsis exists in the fusion area.

SELECTION OF PATIENTS UPON WHOM TO DO
A SPINAL FUSION

The patients were divided into groups according to the types of anomalous and de generative changes present. It was found that no essential differences existed in these groups as to the type or seventy of symptoms present and the degree of relief obtained by fusing the spine Patients having thin inter vertebral discs between first sacral and fifth lumbar or fourth and fifth lumbar in whom the likelihood of a posterior herniation of the disc was greatest obtained as good results as as that secured for the all groups average The only differences in the groups were that those having spondylolisthesis or a transitional fifth lumbar vertebra in which the fusion extended from the first sacral to the fourth lumbar had a higher percentage of pseudarthroses and a proportional rise in the number of failures Age did not affect the incidence of pseudarthrosis The results obtained were slightly better in young adults, but this was about proportionate to the greater incidence of generalized osteo arthritis and more frequent foci of in fection in the older Likewise, older patients had more difficulty in amhulating and in regaining their strength after operation Spinal fusions in patients over 55 years of age are seldom warranted

While there is no relationship between preoperative roentgenographic findings and the results obtained at operation, it is generally the opinion of members of the New York Orthopædic Dippensary and Hospital staff that patients having spondylolisthesis, an atrophic intervertebral disc which is associated with an o-teo arthritis, an abnormally acute lumboacral angle, severe posterior displacement of the fifth lumbar vertebra, a transitional vertebra, or extreme asymmetry of the lumboacral joints respond least well to non-operative treatment. At present we have no statistical evidence to support this, it being difficult to follow an unselected group of patients not operated upon over an adequate period of time.

Many chines today are discovering an unusually high inudence of hermations of the interverteiral disc posteriorly in patients having sciatica. It is well therefore to do spinal punctures and, if necessity, lipiodo injections on all upon whom a spinal fusion is contemplated. As previously stated, there is reason to believe that arthrodesis of the spine to include the area with the involved disc is a good procedure. It will he interesting to see if patients with definite lipiodol evidence of disc protrusion are relieved by spinal fusion

In the selection of patients the following points must be kept in mind (1) Those having generalized spinal arthritis are much less likely to get a complete cure. However, if pain is severe and well localized it may be feasible to fuse such a patient with the understanding that a lumbosacral fusion does not rud one of pain in the upper lumbar, dorsal, or cervical spine (2) A careful search for and, if possible, elimination of foci of infection should be made before the spine is fused. (3) Conditions such as spinal cord tumors, tuherculosis, spon dylltis ankylopoietica (early stages), and the possibility of causative factors higher in the spinal column must be kept in mind.

PSEUDARTHROSES

In 195 patients having lumbosacral fusions and followed after operation for a minimum period of 3 years and an average of 5 years and 11 months, there were 25 (12 8 per cent) in whom pseudarthroses were demonstrated at subsequent operations. An additional 11 (16 per cent) had roentgenographic and climical evidence of pseudarthroses and 5 (26

SITES OF PSEUDARTHROSES

Fusions of the first sacral to fourth lumbar

and first sacral

second lumbar

to third or

1 pseudarthrosis between first saeral and fifth lumbar only

7 pseudarthroses between fourth and fifth lumbar

11 pseudarthroses between both fourth and fifth lumbars and first sacral and fifth lumbar

1 pseudarthrosis between the third and fourth

lumbar

per cent) very definite roentgenographie findings but no symptoms, making a total of 21 per cent of the whole group Significant is the fact that only 62 per eent of the 80 fusions that extended from first sacral to fifth lumbar had pseudarthroses, while in the 93 going from first sacral to fourth lumbar and the 22 going from first sacral to third lumbar or second lumbar, the incidence was 31 2 per cent and 31 6 per cent, respectively If one excludes from the latter two groups patients having spondylolisthesis, the incidence is 28 8 per eent This is still 46 times as many failures of fusion as when the area arthrodesed goes from the first saeral to the fifth lumbar only In spondylolistbesis the postenor elements are underdeveloped and very mobile, making fusion difficult. In the 42 patients having this condition 35 7 per cent had pseudarthroses proved at operation or revealed in roentgenograms

The sites of pseudarthroses in cases proved at operation is shown in the chart above. A few of these were not visible roentgenographically but the patients were operated upon because of clinical findings. The 5 with fusions of first sacral to the fifth lumbar of course had pseudarthroses at that site

Of the 25 patients who had attempts made to repair the pseudarthroses 11 (44 per cent) had complete relief from symptoms, though 3 did so only after a second repair

Five (20 per cent) had 50 to 90 per cent relief Two of these later obtained complete relief from a fasciotomy. One bad a generalized spinal arthritis and one recurrent chronic osteomyelitis of the femiir in a greatly shortened lower extremity

Nine (36 per eent) failed to be benefited by the repair In 2 of these a pseudarthrosis is still evident roentgenographically, in 7 the fusion appears solid It is to be remembered, however, that it is difficult to tell by roentgenogram whether or not a repair is solid. Of the latter 7, 1 has since been relieved completely by a fasciotomy, 2 have generalized spinal and sacro-iliac arthritis, and in 4 I can and no reason for continued symptoms

The high incidence of pseudarthroses, as well as the difficulties encountered in trying to effect a repair, is discouraging Until about 1028 it was customary to extend the fusion from first sacral to the fourth lumbar routinely, a practice now given up for obvious reasons Certainly all cases of spondylolisthesis and many others would benefit by the addition of small bone chips from the posterior erest of the ilium and this is now being done often. Great care should be taken in removing the articular cartilage and filling the resultant spaces with bone chips. In repairing a pseudarthrosis the fibrous tissue must be removed from the erack and bone chips packed in In addition, attached chips should be turned up over the entire fusion area, insuring a wider band of attachment of the newly formed bone to the old, for they will differ in architecture and therefore represent a point of weakness for several months

CONCLUSION

Low back pain and sciatica are commonly due to an unstable fifth lumbar vertebra which has placed upon supporting muscles, ligaments, and joints, a load they are unable to carry This instability is further increased by the congenital anomalies and degenerative changes common to this area of the spine

The majority of patients will obtain sufficient relief from the non-operative measures outlined to make operation unwarranted

Tensor fasciæ fasciotomy is a useful adjunct to our therapeutic armamentarium and is indicated in selected cases. It is well not to be too positive of its curative effect until several more years are added to the period of observation of patients after operation

Of the operative measures a lumbosacral spinal fusion is the most satisfactor, and is indicated in about 10 per cent of the patients Improved operative technique and better selection of patients should enable one to raise the percentage of cures definitely above that found in the group presented here

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CLINICAL SURGERY

FROM THE DEPARTMENT OF SURGERY, UNIVERSITY OF NEBRASKA COLLEGE

TECHNIQUE OF IMMEDIATE CHOLANGIOGRAPHY

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URING the past 2 years, our experiences with cholangiography have led to certain improvements and refinements which we believe have greatly simplified the technique. As in the development of any technical procedure, these improvements bave been brought about by trial and error, and we are fully aware that the investigations of others will also add valuable information. It has been found, too, that all contrast mediums can be utilized, but some because of their greater fluidity are easier to inject, while the heavier oily solutions seem to possess definite therapeutic properties. Since it is not the purpose of this paper to discuss the many values of cholangiography, it will suffice to say that time and experience have proved this method of visualizing the bihary tract increasingly practicable as a diagnostic aid It has not only enlightened us about common duct pathology, but it has given us a clearer understanding of some of the failures following cholecystectomy, and has enabled us to relieve certain patients of an upper abdominal syndrome which would have relegated them to that group not benefited by gall-bladder surgery. It was observing delayed cholangiograms that prompted us to introduce the use of nitrogly cerm tablets in relieving spasm of the sphincter of Oddi at the last meeting of the American Medical Association

Immediate cholangiography is not a difficult or complicated procedure. It can be carried out in any bospital where there is a mobile or bedside x-ray unit, and once an immediate cholangiogram has been taken, the mere assembling of physical equipment becomes quite simple. The necessary articles are enumerated as follows a bedside x ray unit, a 14 by 17 double screen casette, and a wooden tunnel such as is found in most x ray departments and which is sufficiently large to admit the casette On the instrument table, in addition to the usual gall bladder set up, there should be a large sterile sheet, 25 cubic centimeters of 48 per cent hippuran solution, a 10 cubic centimeter syringe with a 23 gauge needle, and a 20 cubic centimeter LuerLok syringe with a 11/4 inch, 22gauge, short beveled needle (preferably, though not necessarily, the special needle with a metal bead ½ inch from the point) These articles should be assembled in the operating room before the anesthesia is started, so they will be immediately available

The wooden tunnel containing the casette and the film is placed beneath the patient. We have built padded inclines at either end of the tunnel, for the patient's comfort (Fig. 1). The tunnel expedites the removal of the casette and the introduction of another, should a second exposure be desired. We have taken many cholangiograms at the table, however, by merely placing the casette in the correct position under the patient before starting the anesthesia.

After the routine incision and exploration, the common duct is carefully palpated and, if no stones can be felt, it is immediately exposed Isolation of the duct is more easily accomplished by incising the hepatoduodenal ligament near the junction of the cystic and common ducts and separating the margins of the peritoneum Using the 23-gauge needle on the 10 cubic centimeter syringe, the exposed structure is definitely established as the common duct by withdrawing bile into the syringe Since the amount of bile within the duct determines the dilution of the contrast medium, the plunger is drawn back as long as bile can be aspirated. The common duct is then gently grasped with two Allis forceps, one on either side of the small puncture wound made by the exploratory needle, and the field is ready for injection of the contrast medium

A 22-gauge, short be eled needle, 1½ inches long, has been found most practical for injection purposes. During the last few months, we have been using a needle which has a small bead ½ inch from the point (Fig 2). The bead lends security in locating the end of the needle so it does not pierce the posterior wall of the common duct.

Experience has proved that the iodized oils which were first used as contrast mediums are difficult to introduce through small needles be-

LIPIODOL VISUALIZATION OF THE BILE TRACTS IN LESIONS WITH JAUNDICE

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ISUALIZATION of the bhary tract is a very helpful procedure in determining the patentry of the bile ducts. Visualization may be done at operation or any time later if drainage is instituted. By this means, obstructive lesions which are overlooked or unsuspected may be discovered, such as stone, stricture, or pressure on the ducts by tumor, or the duct may be shown to be unobstructed, thus lessening operative interference. In a group of cases in which jaundice was present in varying degrees, we have employed visualization.

The interpretation of our findings were at times at variance with our clinical impressions. This is not difficult to explain, however, for as one reviews the literature on this subject, he is impressed with the wide variance of interpretations.

Visualization has shown the effect of drugs on the sphincter of Oddi. Spasim of the sphincter of Oddi has been demonstrated. Many of the older concepts as to the influence of the sphincter mechanism have been made clear. This will probably result in change in treatment, both medical and surgical, in gall tract disease.

The cases we wish to report are those in which jaundice was due to chronic pancreatitis, care noma of the head of the pancreas, and stincture of the common duct, in which the findings were suspected at operation and venified both by visualization or reoperation. Other cases included perforation of the gall bladder in which drainage had been done and those in which common duct stones were removed with T tube drainage. Visualization was carried out before the drain tube was removed so that chronic pancreatitis or other pathology would not be overlooked.

Lipidol warmed in a water bath to 90 to 100 degrees F in amounts varjing from 10 to 20 cubic centimeters, was injected into the draw tube just above the skin margin of the wound, the tube boing clamped above the six of injection so that the lipidod is oliution would not be wasted in cholecy storomy a Pezzer catheter was used and invaginated by pursestring sutures. This makes a nearly leak proof drain Twenty cubic centimeters of lipidol, when injected with a Laer syringe with slow ordinary pressure, fils the

From The Rush Medical College

ble ducts. When the common duct is injected through a T tube, to to 12 cubic centimeters suffices, unless there is a marked distation of the ducts, in which case more lipited will be required. Too rapid injection of the contrast material may cause pain or may cause a condition resembling shock, as is described later.

The following are histories of patients in whom visualization has been done

Case I Mide aged 40 years entered the Presbyteran Hospital February 35 103; For 5 years he had been tesated foe duodenal titler. That evening the patient was an austeased wormted a small amount of clear fluid and had a severe pain so the abomen which doubled him up. Temperature has off a degrees quite 80 white flood cells 15 too. The abdomen on physical examination had a hard boardisk ferling especially marked in the right upper quadrature prical examination was otherwise domen remaining rigid and tender? A diagnostic structure oppits user as made and the patient was operated upon February 35 1035.

Symbolica When the abdomen was opened there was suph of clear colored fluid. The gall bladder was tense and a stone could be paipated in the cystic duct. There was great deal of swelling about the gastrophest comentum and a blood inged fluid was seen when the finger was included into the foration of Winslow. The small stones were removed from the gall bladder. An impacted stone in the date was studied with some control to the particular that the gall bladder was drained. On the could be palapated in common or hepatic ducts. Because of the acute pancreatities the gall bladder was drained. Culture of the gall bladder blee showed no growth. Following operation the patient because the severe upper abdominal pan at internals which necessitated an opate. There was no ble draining with the said postuporary they when 6 go under continued to the control of the said that are admission.

The patient was instructed to clamp the drainage tube two or three times daily so that obstruction of the duct could be ruled out He said that after the tube was closed for a or 3 hours especially following meals he had a sensa tion of fullness in the upper right quadrant and in the back which compelled him to open the tube and when the bile flowed from the tube he felt relieved This sensation gradu ally disappeared and on March 22 1935 the patient said br had the tube clamped for 7 days There was no discom fort and his stools and urine were normal. No icterus of the skin or conjunctive could be noted. Because of his postoperative discomfort to cubic centimeters of lipiodol was injected into the drainage tube of the gall bladder. In Figure 1 lipsodol is seen to fill the hepatic cystic and com mon ducts and the gall bladder Figure 2 was made one half hour after a fat meal and shows a small amount of lipsodol in the small bowel though the gall ducts are still



Fig 1 Lipiodol fills the gall bladder, cystic, hepatic, and common duct, filling defect in the pancreatic portion of



Fig 2 Thirty minutes after fat meal Lipiodol is seen in the duodenum

filled Figure 3 was taken I hour after 1/100 grain atropine sulphate was given hypodermically. Here the bile ducts are fairly well emptied. The tube was removed from the gall bladder, as it was thought the ducts were patent

The patient returned to the hospital 1 month later, April 23 1935 He complained of severe right upper quad rant pain which was referred to the back and shoulder

blade and which was relieved by morphia

The skin and sclera were deeply jaundiced Itching was intolerable. The urine was dark with bile and repeated stool examinations failed to reveal any bile. Wassermann and Kahn tests were negative. White blood cells numbered 8,800, hemoglobin was 70, red blood cells 4,300,000. Tem perature was 98 6 degrees pulse, 88. Bleeding time was 51/2 minutes, congulation time, 40 seconds

After 4 days' observation, exploration was advised a tentative diagnosis of common duct stone having been

made On exposure of the bile ducts, no obstruction could be palpated. The head of the pancreas was uniformly thick

ened The common duct was opened and explored, and a catheter passed into the duct was felt in the duodenum It was thought a small stone could be felt in the ampulla, but that the stone had passed into the bowel A T tube was placed in the duct and sutured in place, and the abdomen was then closed

The postoperative course was uneventful Bile dramage from the tube averaged about 500 cubic centimeters daily The stool gradually became normal The jaundice re ceded The patient left the hospital 25 days later Cul tures of bile showed the Bacillus coli

The T tube was allowed to remain in place, and for 2 weeks before lipiodol visualization of the tracts, the tube



Fig 3 One hour after 1/100 atropine sulphate was jected bypodermically ducts are nearly free of lipiodol



Fig. 4. Lipiodol injected into T tube pa. es at once into the duodenum

was clamped off \(\rightarrow \) external drainage of bile occurred. The sensation of fullness which the patient complained of at previous operation gradually disappeared.

Fig. 4 and 3. Six cubic critimisers of lipsoid was in percet through the T tube into the bile tiret. 4 film taken immediately (Fig. 4) hows the ipsoid in the dooderum toom later alor tend (Fig. 3) the tracts are entirely free of lipsoid. The tim tricture like hadow of the dust in the region of the head of the pancers had disappeared. The T tube was allowed to remain in place for 2 nove weeks. The citerius index was 2, The tube was rimoved. The patient has remained in good health lines the removal of the tube.

From a study of the lipsodol visualization, the finding of acute inflammatory changes in the pain creas and subsequent history it seems that the resulting complications developing in this case are due to a paincreatitis with pressure on the blie ducts with resultant justification of the ducts with resultant justification and companying the closure of the drainage tube was due undoubtedly to back pressure of big.

The next case so illustrates. This patient had the type of silent jaundice in which doubt arises as to whether we are dealing with a non obstructive or obstructive jaundice.

CASE 2 Mrs E C 44 years of age a patient of Dr C M. Bacon entered the Fresbyteran Hospital May 12 1035. In Marth, the patient had an attack of indigestion and a few days later she had a pain in the epigastrium that doubled her ip. The pain persit ted for 4 hours, but did not radiate. She felt naussated, but did not vomit. The disradiate.



Fig. 5. One hour after fat meal bile tract a nearly enturely free of Lpsodol.

tress passed off and from time to time she had had "varue unealiness" after eating expecially fathy food... Since April, 1935 she noted that her akin suched and had

become vellowish in color and that her evols were clay

colored and her unne verv dark.

Emmunation showed whr e blood cells 6,400 red blood cells 4,500 coo hemorlobin to per cent urne ble, 111 stools, no bile Wassermann negative Graham Cole, very poor tiling of gall bladder. Floorescope of stomach and

colon was negative
The patient was placed on medical management. She
r-entered the hosp tal May 31 1033 Laboratory findings
Bleeding time, 14 minutes coarcilation, 314 minutes

white blood cells, 50 red blood rells, 4, mo.coo hemo-

globin 68 per cent.

The patient suffered with intolerable itching. On physical examination, the abdomen revealed a shirp liver margin extending about 5 inches below the creal kerder. No induct tenderness or inclusives, presert. The shin and schera were items and the physical examination was other wise negative.

The patient was prepared for operation with a hellantibodizate duct. A direct blood transitions was given immediately following operation. There was marked course when the abdominal measure was made every limiting point was firsted and the abdomin operation. The liver was started and the abdomin operation. The liver was set after add and continued about 1 we online committees of this green, a bille. No stores were pulpated in the gall ladder or ducts. The head of the painness was firm, hard, though not of a cartilagnous hardness characters to dicurrences. There were many small short the gainst short the gather than the store were found and the store of the deep course cause of the deep number and the his bleeding time, a. I take

was sutured into place in the common duct and the ab domen was closed The operative diagnosis was chronic pancreatitis with a possibility of early carcinoma of the head of the pancreas

There were no serious postoperative complications The bile drainage was dark thick, and averaged 355 cubic centi meters for 4 days On the fifth day, rooo cuhic centi meters of golden hile was collected. The average hile drainage for the next 38 days was 1,226 cubic centimeters

By pushing fluids, the daily intake exceeded or equaled the combined biliary drainage and urinary output. The pigmentation of the skin and sclera was most persistent The stools on repeated tests showed no hile Duodenal tube dramage failed to reveal any bile in the duodenal contents The urine hecame free of hile on June 11, 1935

Liniodol visualization of the ducts was carried out Tis ure 6 shows the hepatic and common as well as the left pancreatic duct filled with lipiodol There is no evidence ol limodol in the intestinal tract. During this examination 20 cubic centimeters of lipiodol was used with moderate pressure The patient complained of severe pain in the upper region of the liver and the back of the right side This persisted until the drain tube was opened when the pain gradually decreased as the bile drainage increased The pulse was slow and weak and the patient became cold, clammy, and perspired

On July 11, 1935, revisualization of the ducts showed complete blocking and July 13, 1035, a cholecystogas trostomy was done. A further exploration of the ducts failed to reveal any stones The pancreas at this time was distinctly indurated, but the lobules could be distinguished on palpation Following operation the stools hecame nor mal and the patient was discharged from the hospital on the twelfth postoperative day. She gradually regained strength and remained in very good health for about 6 months when pain in the right upper quadrant with nausea and vomiting became persistent and severe X ray studies showed a filing defect in the second portion of the duo denum with only partial emptying of the stomach. At exploratory operation, the head of the pancreas was found to be enlarged with a cartilaginous hardness. It practically obstructed the lumen of the duodenum. A posterior gas tro enterostomy gave the patient a brief respite from her symptoms She died 18 months after the onset of symp toms with the usual cachectic picture one sees in carcinoma of the head of the pancreas

The following case, in which patient was a male aged or years, illustrates the value of exploratory operation and bile tract visualization in elderly patients with jaundice

Case 3 Male aged 6r years, entered the Presbyterian Hospital October 6, 1935 with the following history Dur ing the past 6 weeks, the patient had developed a deepen ing painless jaundice with acholic stools and intolerable itchirg There had been some nausea and loss of appetite, hut very slight loss of weight The patient admitted luctic infection 20 years previously for which he had had pro-longed treatment. He was also a moderate drinker. There had been no recent ingestion of toxic drugs or alcoholic ex

The essential findings on physical examination were those of a marked jaundice in an elderly, well nourished male of 61 years There was slight tenderness in the epi gastrium The liver was enlarged, the edges smooth and extended about 4 inches beneath the costal border There was no evidence of ascites or edema. Temperature was 98 6 degrees, pulse 70, red blood cells 4,450,000, white



Fig 6 Lipiodol injection shows complete obstruction at the ampulla of Vater with filling of the left panereatic duct

blood cells, 12,350 Urinalysis showed bile, plus four The acteric under was 151 8 Stools, on repeated examina tion, showed no bile The Wassermann reaction was nega tive A ray studies of gastro intestinal tract showed no demonstrable pathology Rose Bengal test for liver func tion gave 37 per cent in 8 minutes and 57 per cent in 16

Repeated duodenal intubation with injection of mag nesium sulphate, 50 per cent solution, or olive oil, failed to cause biliary discharge. The patient was observed for about 2 necks when an exploratory operation was advised The diagnosis was probable impacted stone in the common

duct or malignancy

At operation, the liver was found to be enlarged and mahogany brown in color The gall bladder was enlarged and distended No stones were present in the gall bladder or ducts The head of the pancreas was indurated Thick, inspissated hile was aspirated from the gall bladder and a No 28 Pezzer catheter was invaginated with two purse string sutures Five hundred cubic centimeters of blood was given by direct transfusion

The postoperative course was uneventful, the daily av erage bihar, drainage being 345 cubic centimeters. On the seventh postoperative day, hile appeared in the stools Before patient left the hospital, the hile tract was visual ized, 20 cubic centimeters of diodrast being used. A roent genogram (Fig 7) showed that most of the contrast fluid passed at once into the small howel although some was in the ducts A second film r hour later showed only a small amount in the inner tip of the drain tube

The patient was instructed to clamp the drain tube for I hour daily, increasing the time period an hour each day if no discomfort was experienced. When he returned



Fig 7 Diodrast fills the ducts and passes at once into the duodenum

December 27 1933 the tube had been unopened for several days (Figs. 8 and 9) Laptodol visualization was then done The roentgenograms show the filling and emptying with liptodol

It is interesting to compare these films. Be cause of its viscosity, lipicodol is slower in emptying from the ducts, whereas diodrast empties into the small bowel at once. This fact may account

for the difference in interpretation in visualization of the bile tract and should be considered when contrast media such as diodrast are used. One month after the last visualization, the drain tube was removed. The patient has remained in good health since. The finding of a chronic manacreatitis with obstruction of the common duct was noted at operation. Spasm of the sphincter of Oldin is unlikely, for repeated duodenal lavage by drugs supposed to relax a sphincter spasm failed to bring the rehef that decompression of the bilary tract by drainage effected.

CASE 4. Weman, aged 45 years entered the Presby terran Hospital July 20 1935 with the following bixes behalf and a cholecy-tecture in March, 19 0 at which time a diagnosis of choletiphan is was made. A few days to following operation who complained of severe pain in the rigigestians and the right upper quadrant, which was reing the companion of the patient has lade recurring plan at intervals accompanied by naview sometimes by vomiting with value accompanied by naview sometimes by vomiting with coactionally dark turnes and squadree She has peer routined whether her stools were clay colored. She has lost 20 counted in 2 very colored. She has lost 20 counted in 2 very large and the counter of the counter

Physical examination was essentially negative. There were noted the old operative scar and netodeness in the night upper quadrant. The liver and spleen were not public. Temperature was 98 degrees public of preparation so blood pressure 100/72 homoglobus 64 per cent too so blood pressure 100/72 homoglobus 64 per cent more was 150 holding turn expensive more was 150 holding turn expensive you muster compution 3 minutes. Wassermann reaction was negative 1 and on Bergh very much delayed by the direct method.

An exploratory operation was done August 5 1935 by Dr W Potts ethylene anesthesia being used. The ducts



Fig 8 Lipiodol fills the hile tract but because of its viscosity does not at once enter the duodenum.



Fig 9 One hour alter fat meal tract is nearly free of

were found slightly enlarged. No stones were found, and a T tube was inserted into the common duct Operative diagnosis stricture of the terminal portion of the common duct The postoperative course was uneventful There was a flow of golden yellow bile that averaged about 650 cubic centimeters daily The T tube was clamped daily for increasingly long periods, first for a 30 minute period and increasing until a 5 hour period was reached On clamping the tube, the patient complained of pain in the right upper quadrant and back. The pain was so intense that she in sisted the tube be opened. The stools have remained acholic but the urine was bile free On August 15, 1935, a lipiodol injection into the bile tract was done (Figs 10 In the roentgenogram lipiodol outlines the hepatic and common ducts There is some lipiodol in the small bowel A film taken 1 hour later shows practically all the lipsodol in the bowel. There is a small amount of lipiodol in the hepatic ducts The pancreatic portion of the common duct appears constricted Lipiodol injections were repeated on September 14, 1935, and revealed a simi lar defect in the pancreatic portion of the duct. One hour after a fat meal the x ray film showed only traces of the lipiodol remaining in the ducts

Despite the fact that the lipsodol empited from the ducts after a fat meal, closure of the drain tube for a 5 hour period caused the typical distress for which the patient entered the hospital. She was again operated upon and a choledochodwodenostomy was done. The patient left the hospital, and when last seen was entirely symptom free.

Case 5 Male, aged 42 years, entered the Cook County Hospital in March, 1935, with a diagnosis of catarrhal jaundue He gave the history of loss of weight, clay colored stools, and loss of appetite and strength the noticed that his skin was yellow tinged and he complained of severe itching



Fig 10 Lipiodol injection shows a structure of the pancreatic portion of the common duct

Physical examination was essentially negative, except for right upper quadrant tenderness and the presence of jaundice. He remained in the hospital for a short time, and when he left the jaundice had disappeared, and he felt perfectly well.

On August 24, 1935, he returned to the hospital complaning of severe oppressive pain in the epigastrium and lower chest which encircled the body. It was so severe that morphine did not give relief, and because a coronary thrombosis was suspected, he was given nitroglycerin r/ioo grain hypodermically which treatment gave him in stant relief

Physical examination revealed jaundice of the sclera and skin, slight henderness in the right upper quadrant of the abdomen. The other findings were essentially negative. Temperature was 98 degrees, pulse 86. Examination showed that the stools and stomach content were normal wassermann reaction was negative, Graham Cole showed no filling. Ieteric index was 37. Patient was prepared for operation. Eight hundred cubic centimeters of 25 per end dectrose solution was given for several days, and he was transferred to surgery.

At operation September 2, 1935, the gall bladder was found contracted No stones could be felt in the gall bladder, hepaire, or common ducts. The head of the pan creas was firm, hard and indiscrete. No nodules could be felt. The ducts were explored and a T tube was sutured in the common duct.

The postoperative course was uneventful. He was given destrose solution to to 25 per cent intravenously for 3 or 4 days. The T tube was clamped after the third day. The average drainage through the T tube was 200 cubic centimeters daily.

On September 24, 1035, lipsodel injection of the gall tract showed that common and hepatic ducts were out lined with a slight amount of lipsodel in the first portion of the duodenum. One hour after a fatty meal the ducts were entirely free of lipsodel. The T tube was removed some weeks later.



Fig II One hour after fat meal lipsodol has passed into the small bowel

weeks later



Fig. 12. Lipiodol fills the bile tracts and passes into the duodenum

The probable diagnosis in this case was common duct stone which may have been paced when the patient was admitted the second time to the hospital, at which time he suffered such severe pain. That there was an associated pan creatitis was evidenced at operation. The hipodol injection does not show that the industrion is now present and the T tube was removed some

CASE 6. Female arect of years was admitted to the hospital with a history of recurring attacks of pain and discomfort in the right upper quadrant of 30 years duration. This last attack had been more severe than any accompanied by chils fever naves and vontum; as well as to severe pain. She stated that the had been jasonificed at times in the pandice had always sub-

sided This time however the jaundice had persisted The patient was a well nourished female of apparent age with slight interior tinge to the solera. She appeared acutely

The physical findings were essentially normal with the following exceptions There was marked rigidity and ten derness in the region of the gall bladder, and a slight abdominal distention Temperature was 1006 degrees pulse 90 white blood cells 24 000 Urine was negative on analysis The patient had been acutely ill for several days before admission. She was treated conservatively for a few days there being no sub-idence of symptoms and on leucocytic increase operation was advised with the diag nosis of acute cholecystitis with stone At operation a small perforation at the fundus of the gall bladder was found The gall bladder cuntained many stones An im pacted stone was dislodged from the cystic duct. No stones could be felt in the hepatic or common duct or ampulla of Vater The right hepatic cystic and common duets were thick and indurated The head of the pancreas



Fig. 13. Bile tracts free of hipsodol after fat meal. No obstruction in duct.

felt normal ANo 20 Pezzer catheter was invaginated into the gall bladder for drainage. The patient made an un exentful recovers

The tract was later visualized so that residual tones might not be overlooked (Figs. 12 and 13). Bile was allowed to drain for several weeks following operation on that the infection in the ducts could be relieved. The tube was then clamped at intervals as described and removed 3 months after operation. The patient has continued in good health since operation.

CONCLUSIONS

I sualization of the hile tracts at operation
may be decidedly helpful in the finding of un
suspected causes of obstruction such as stricture,
stone, and extraductal or intraductal pressure
It may reduce operative time by showing that
no obstruction is present.

2 Visualization in cases of drainage may be helpful in showing that the bile tract is unobstructed, or that induration of the biliary tract is still present and that continued drainage is advisable.

3 Visualization using varying types of con trast media may be helpful in a study of the sphincter mechanism of the biliary tract

4 Early decision that the lesion is an operative one is essential so that patients who, because of their age and condition may be given the benefit of prompt surgery. This is important because of the difficulty in distinguishing between mahignant and non malignant obstruction

s Active measures to combat the effect of

aundice are those that seek to repair the damage to the liver, the blood, and other organs The giving of glucose intravenously or by mouth, the use of calcium salts such as calcium, gluconate, and finally repeated blood transfusions, are important

6 Relief of the jaundice with minimum trauma to the patient is essential. Cholecystotomy or common duct drainage with removal of the offend ing cause at a subsequent period may be a factor in reducing operative mortality. If the patient's condition permits, direct visualization of the bile

tracts may make a second operation unnecessary 7 Postoperative maintenance of fluid balance and blood chlorides is essential to compensate for the loss by external biliary drainage

8 Control of biliary drainage by the use of a soft, phable T-tube or a Pezzer catheter prevents too rapid hepatic decompression, and also is a factor in preventing fluid loss

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ADDITIONAL ADVANTAGES OF THE HAWLEY TABLE

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TRACTURES of the spine have been on the increase during the past few years Automobile accidents chiefly account for this increase Forced flexion of the spine results in compression fracture. This may be the sole mury

Improvement in roentgenographic technique, especially the perfection of lateral graphs, has From the Orthopedic and Fracture Service of the Budgeport Hospital

made it possible to detect these fractures with greater accuracy and certainty. The element of error has been reduced and fewer fractures are os ericol ed

The introduction of hyperextension in the treat ment of these fractures has been a step forward This method usually results in reduction of the fracture deformity, even when there is an associated dislocation

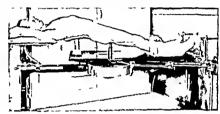


Fig 1



Fig. 1 above Hyperextension of spine by direct application of force. An automobile jack is used to exert pressure at the point of fracture. This is a direct method of hyperextension in contrast in indirect, physiological, or postural hyperextension of spine by po tone. Ventral position with legs suspended and things extended on pelus Haded can be rased by elevating foot pieces at end of legs buts. Fathert extended on pelus Haded can be rased by elevating foot pieces at end of legs buts. Fathert expended for poentgenography and application of plaster.



Fig 3

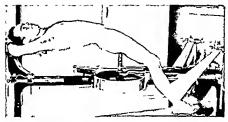


Fig 4



Fig 5

Fig. 3. Hammock for ventral suspension aboves of a 5 inch muslin bandage are wound between the central cross bar and the bar resting on foot pieces. The hammock is made taut by extending leg bars. After ham mock is in place the table top is raised the pattent is placed on the table and is suspended as in Figure 2 Fig. 4. Physological hyperetension of lumbodorsal spire. (Site of many compression fractures) Dorsal popular of the bower section of the table top is removed. The thinghs and legs are then extended. In the dorsal post unit is possible to examine, roentgengraph hyperextend, and immobilize without moving pattent. Increased hyperextension is secured by using the sling as shown in Figure 5.

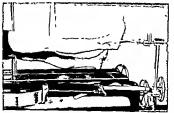


Fig 6

Fig 5 Hyperextension by sling Several thicknesses (to give strength and prevent winkling) of mushin bandage are used with a pad of felt. The sling can be used in combination with extension of the legs as shown in Fig ure 4.

Fig. 6. Traction on tibia using Lirschner usir or Stein mann pin through the lower end of the tibia or os cales Wire is introduced and a loop is applied with the table op raised and the leg resting on the table. The method is effective in the reduction of fresh fractures and immobilization in plaster. Roentgenologic control is ment. The method is useful in open reductions to obtain traction during operation.

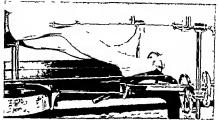




Fig 8



Tig o



Skeletal traction on femur Skeletal traction on forearm Two wires are

Figures 1 to 5 depict the various ways of securing hyperextension on the fracture table

SKELETAL TRACTION

Skeletal traction has become a standard method of fracture treatment It is in general use, espeused one for traction and one for countertraction distal ware is placed I inch from the end of the radius ex ternal to the radial vessels and other wire is placed rich inches from the tip of the olecranon Both wires are slightly off center and on different bones but experience shows that the method is effective in the reduction of fractures of one or both bones

Fig o Suspension of the forearm and elbow with manual traction Patient is placed on the table. The elbow hook provides a firm point of countertraction arm is free for examination manipulation roentgenological examination by fluoroscope or graph. The method is effective in elbow fractures and dislocations in fractures and dislocations of the head of the radius in fractures of the radius and ulna in Colles fractures where it is possible to combine strong traction with manipulation and leverage at the point of fracture and in dislocations of the semilunar

Fig to Control and suspension of the forearm with patient sitting by the table. This method is useful in subjects suitable for reduction under local anesthesis.

cially since the introduction of the Kirschner wire and tension loop Figures 6 to 8 are three photographs showing skeletal traction as applied to the tibia, to the femur, and to the bones of the forearm In the first two, the wires are introduced with the table top up and the perineal post used

for countertraction The limb is exposed for physical examination, manipulation, and roent-genologic examination by fluoroscope or graph After reduction, the table top is lowered for immobilization in plaster

Figures 9 and 10 show suspension and manual traction in the treatment of fractures of the elbow and bones of the forearm. The elbow hook makes a point of strong countertraction. Expenence has shown that strong traction is readily borne without the use of padding. This method is

practical and effective in the treatment of diacondylar fractures of the humerus, dislocations of the elbow, dislocations and fractures of the head of the radius, fractures of shaft of radius and ulna, and Colles' fractures, where it is possible to combine strong traction with manipulation and leverage at the point of fracture. The arm is exposed for roentgenological examination before, during, and after the treatment, and is in position for plaster encasement after reduction has been effected.

THE "HANGING CAST" IN THE TREATMENT OF FRACTURES OF THE HUMERUS

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HE "hanging cast" is a plaster cast applied from the axilla to wrist with the elbow fleved to a right angle, a sing suspends the cast from the neck. It was first suggested by Dr J A Caldwell in ro33, for some fractures of the shaft of The humerus. We have used the "hanging cast" extensively in fractures of the shaft and of the neck of the humerus. It is our purpose to report roentgengraphic and climical results obtained in 58 cases in which patients were treated at Receiving Hospital during the year beginning November 23, 1935, and ending November 23, 1935, and ending November 23 to discuss the advantages and disadvantages of this method

The treatment of fractures of the humerus in adduction has been debated considerably Various authors (2, 3, 41, 5, 6, 7) suggest different methods, but none offers case reports so that no comparison of results is permitted. We hope that our data will be of value in answering this question

Not all fractures of the humerus were considered suitable for treatment with the "hanging cast", badly communited fractures of the head and fractures involving the condyles or the supracondylar area were treated by other methods

The patients whose histories are reported in this paper were observed from the time of injury until discharged from the clinic with healed fractures. All cases in which patients were so ob-

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served are reported so that poor as well as satisfactory results are presented. A number of cases in which progress was satisfactory are omitted from this report because the patients did not return for final examination.

We have used the following classification based upon the x ray findings in the fracture when first seen

nerus (a) in good or fair position, (b) in poor

2 Fractures of the middle and lower thirds of the shaft of the humerus (a) in good or fair

position, (b) in poor position

Twenty three fractures were in the upper-third of the humerus in good or fair position. The cast was applied following x-ray examination with the patient either sitting or recumbent, the injured arm was abducted carefully and the elbow flexed. while plaster was applied extending from the axilla to the wrist, not including the wrist joint Three rolls of plaster, 6 yards long by 6 inches wide were used for adults, the cast weighed about 2 pounds when dry A plaster loop was incorporated at the wrist to permit suspension from the neck. The cast was trimmed at the axilla and wrist so that motion would cause no discomfort Passive motion at the shoulder was then employed whereby the patient leaned forward and let the arm swing, later, active motion was urged Active motion of the wrist was encouraged from the beginning Following application of the cast, the position of the fragments was deter-



Fig r Case 42 (Table III) One week after removal of hanging cast and 5 weeks after transverse fracture of middle third of humerus

mined by x ray examination. The progress of the patient was observed at 2 week intervals.

In this group the age varied from 5 to 86 years Practically as many transverse as oblique frac tures occurred The cast was applied soon after the accident, although this was delayed when the general condition of the patient was poor (Cases 2 and 3) In 9 cases (7, 8, 13 14, 18, 19, 21, 22, 23) the patient was not hospitalized. The cast was removed after periods varying from 3 to 9 weeks depending upon clinical and roentgenographic findings It is interesting to note that there was no slipping of the fragments except in Cases 2, 9 and 10 where definite improvement in position occurred. We do not believe that this method should be used to correct a displacement, only fractures in good or fair position should be so treated Displacement should be corrected by manipulation or operation

While the consistently satisfactory roent genographical results are important, bet the early and unusually good function of the shoulder is the outstanding feature of the method (Fig. 1) Upon removal of the cast or upon the discontinuance of physiotherapy, as shown in Table I, a shoulder which functioned almost as well as well as



Fig. 2 Abduction wedge on inner side of cast to prevent lateral angulation

before injury was termed excellent. The ability to abduct the arm to go degrees, with only slight limitation of external rotation was considered good, a less degree of function was termed "goof, a less degree of function was termed "frair". Slight motion was termed "goof We have observed that a shoulder which was not been that motion for a period of 6 or 8 weeks would have marked limitation of motion and muscular atrophy, function returned but par talls with extended physiotherapy.

If in the use of the hanging cast" a patient is encountered who would not do the bending ever cases as advised, it would seem to us that a cast which held the arm in abduction would be preferable as physiotherapy would probably restoremoun at an earlier date. Treatment with the

hanging cast does not immobilize the fracture site it does offer the patient the opportunity to restore the shoulder to as near normal function as possible. We emphasize this point, because some patients do not understand, or are afraid to follow directions. These patients must be seen at frequent intervals for examination and en couragement. In this group, 3, cases (6, 10 and 12) required extensive physiotherapy to the shoulder, the rest carried out exercises at home Lattle difficulty was experienced because of immobilization of the elbow, residual stiffness desappeared with moderate use. Atrophy of muscle and bone from disuse was almost avoided.

The appearance of the shoulder in this series was normal. Union occurred without delay. No complications were observed.

Ten fractures were in the upper third of the

TABLE I —FRACTURE OF THE UPPLY THIRD OF THE HUMERUS INCLUDING THE SURGICAL NLCK IN GOOD OR PAIR POSITION

Circ	Age	Type of fracture	Date of injury	(ast applied	Number of weeks in cast	Final x ray	Physiotherapy	Function of shoulder
1 Mrs II B	57	Irregular transverse	It- J-3	11 25 35	8	Excellent	Nσ	Excelent
2 Mr A L	76	Spiral oblique	17- 2-15	12-6-33	5	Excellent	No	Excelent
3 Mr T W	55	Transverse	12- 4-15	13-10-35	7	Excellent	No	Good
4 Virs L. R	46	Transverse	12- 4-35	1 - 5-35	5	Excellent	For 2 Wks	Erce.lent
5 Mrs C M	86	Oblique	12-24-15	1 -24-35	4	Excellent	No	Excellent
6 Mrs. M M	59	Oblique	1 S-37	1-0-36	•	Excellent	No	Excellent
7 Mrs M M	72	Oblique	1-20-36	1-10-16	8	Excellent	No	Good
8 Mr L M	53	Spiral, oblique	1-30-36	1-30-36	4	Good	No	Excellent
9 Mrs VI E	67	Irregular transverse	- 1 30	3- 5-36	8	Excellent	For 3 mos	Good
10 Mrs 1 T	63	Oblique	a- 4-36	2- 5-36	4	Excellent	For 4 wks	Excellent
11 Mrs. R S	33	Oblique in partial apposition	4- 0-10	4 7-36	8	Good	No	Emelone
12 Mr P B	37	Oblique	4 20-55	4-21-36	7	Good	No	Car
13 Mas 31 C	12	Transverse	0- I-3f	6- t-36	1	Excellent	No	N ATT2-
te Mr O G	62	Transverse	6 8-16	6- 8-36	6	Eacellent	For 8 wks	Far
25 Mrs. L B	31	Transserse	6-10-36	0-12-36	7	Excellent	No	Esper
16 Mr E P	44	Oblique comminuted	0-11- 30	6-12-16	4	Excellent	No	5 rra.
17 Mas E C	25	Transverse	0-12-50	6-16-36	5	Excellent	١. ١٠٥	Pz + mr
18 Mr G C	23	Oblique	7-18-36	7-18-36	5	Excellent	No	Fra mi
19 Mus D S	14	Transverse	8-27-36	8-27-36	4	Excellent	No.	Fz.
20 Mr B H	65	Oblique	9- 3-36	o~ 4=36	7	Excellent	١٠.	Cont
21 Mr S 4	5	Oblique	9-10-16	9-10-36	4	Excellent	No.	Ti Phal
22 Mr E D	65	Transverse	9-14-36	9-14-36	5	Excellent	No	FLAR
23 Mrs T K	7.4	Transverse	10-15-36	10-15-36	6	Excellent	For 3 wks	Court

children suffered displacement of the shaft laterally to the neck, 8 adults suffered displacement of the shaft medially with overriding of the fragments in all but 2 cases

Early manipulation under deep anesthesia was first attempted. With the patient recumbent on the fluoroscopic table, strong force was applied to the arm in two directions first, by traction with a flannel band passing around the flexed elbow of the patient and around the operator's waist, and, second, by pressure exerted at the fracture site at right angles to the shaft, to correct the medial or lateral displacement Countertraction was obtained by a sheet around the thorax Spasm of the pectoral muscles was overcome with difficulty usually, a reduction of the displacement could often he seen externally The "hanging cast" was applied when a good reduction was evident in the fluoroscope Roentgenograms were taken the next day and at 2 week intervals Satisfactory

reductions were obtained by manife's ne - 5 cases

In 2 cases (24 and 29) in which right-failed, traction by means of a kirchiter through the oleranon was used No firment was obtained. Open reductive the

It is our belief that open reduction in when manupulation fails. In one case, operation, and then replaced by a cast." In 3 cases (28, 20, and 33) for cast." was applied following operation of the fragments was used of the cast. In a case (28, 20, and 33) for cast, was applied following operation of the fragments was used of the case of the

TABLE II —FRACTURE OF THE UPPER THIRD OF THE HUMERUS INCLUDING THE SURGICAL NECK IN POOR POSITION

	-	Q 2 2 7						
Case	Age	Date of injury	Type of displacement	Corrective procedure	Number of weeks in cast	Final 2 ray	Physio- therapy	Function of shoulder
as Mr S B	2 100hes overriding than unsuccessful open reduc-		Manipulation and skeletal trac- tion unsuccessful open reduc- tion with airplane spica hang- ing cast applied after 3 weeks	\$	Excellent	For a mos.	Normal	
as Mr F J	49	1123-35	Shaft medial to head with z / inches overriding	Manupulation hanging cast	8	Excellent	For 3 mos	Fair
26 Mr P G	3	5- 7-16	Shaft lateral to neck with a such overriding	Manipulation unsuccessful, other correction refused. Hanging east	3	Poor	уо	Escellent
27 Mrs. E D	69	7-24-36	Shaft medial to neck with	Manipulation and hanging cast	6	Good	For 4 mon	Good
28 Miss A J	132	7-25-35	Oblique fracture with ,	Manipulation unsuccessful open reduction and hanging cast	4	Excellent	No	Escellent
sp Miss P C	,	7-22-36	Shaft lateral to neck with	Manipulation and skeletal trac- tion unsuccessful open reduc- tion and hanging east	5	Excellent	No	Aormal
30 Mr G R	65	8 -6-36	Comminution of neck with	Manipulation delayed za days hanging cast	6	Good	For s mo	Good
is Mr F 11	77	8- 6-36	Shaft medial to head with a such oversiding	Blampulation banging cast	7	Excellent	For 5 mos	Paur
ga ble lf L	35	8-10-36	Shaft medial to head with inch overriding	Blauspulation hanging cast	8	Excellent	For s wha	Good
33 Mr K P	87	8 29-56	Shaft d splaced mward	Manipulation unsuccessful open red ction a 3 hanking cast	6	Good	For a mos	Fair

Case 26 is of interest. The child had lateral displacement of the shalf with overriding of 1 inch Mampulation under anesthesia failed. The parents refused permission for hospitalization or operation. A hanging cast?" was applied for 3 weeks, solid union occurred with no improvement in the position of the fragments. The shoulder function was normal, some deformity was evident. The roentgenographical result was unsatisfactors.

Union occurred in all without delay, the cast being removed after periods varying from 3 to 8 weeks. The appearance of the shoulders was normal. No vascular or neurological complete tions occurred. In Case 37 the patient suffered a contracture of the fingers despite satisfactory function in the wrist, elbow, and shoulder. More physiotherapi was required in these cases than in the undisplaced fractures (Table II).

A review of 33 fractures of the surgical neck of the humerus shows that good results, both anatomical and functional, can be obtained by the "hanging cast". Long periods of hospitalization in a fecumbent position are avoided, air plane splints and spicas are a noded. The advantages to the aged are many. Mampulation offers better results than traction in the correction of displacements. To the co-operating patient the "hanging cast" presents an opportunity to

obtain a good functional result, the patient, however, must be closely super-used Simplification of treatment of these fractures is not without its hazards. Most patients will not carry out active motion unless constantly encouraged. The fact that the fracture site is not immobilized presents an obvious target for criticism, but in the series here reported, no case suffered delayed union or not union.

Stateen fractures involved the middle or lower thard of the shaft and were in good alinement and partial or total apposition. Ten were transverse fractures were communited and irregular, 2 were through the thinned walls of bone cysis. All but 2 occurred in adults.

In this type of fracture, the chief problem us as in maintain good apposition and alinement while applying the cast and during the convalescent period. When the cast was applyed many of three fractures would slip out of position unless the cllow was maintained in acute flevon. If acute flevon made the application of the circular cast impossible, a posterior plaster splint was applied and the cast was then completed. Moderate traction at the elbow usually sufficed to hold the fragments during the application of the plaster No anesthetic was used in these fractures. Fluoroscopic and reentgenographical examinations were

TABLE III —FRACTURES OF THE MIDDLE AND LOWER THIRD OF THE HUMERUS IN GOOD OR FAIR POSITION

Case	Age	Type of fracture	Date of mjury	Cast applied	Number of weeks in cast	Final x ray	Physio- therapy	Function of elbow and shoulder	Cosmetic result
34 Miss E B	32	Oblique in lower third	rr-30-35	12- 2-35	9	Excellent	For 1 wk	Normal	Excellent
35 Mrs C M	38	Transverse middle third	12- 1-35	12- 2-35	8	Excellent	For 2 mos	Normal	Excellent
36 Mrs C E	78	Transverse middle third	r2-18-35	12-20-35	8	Excellent	No	Normal	Excellent
37 Mr L M	52	Transverse middle third	12-rg-35	12-21-35	8	Excellent	No	Normal	Excellent
38 Mr A S	32	Bullet fracture middle third	1- 1-36	1- 5-36	7	Slight lateral bowing	No	Excellent	Excellent
39 Mr J M	55	Transverse middle third	1-17-36	1-19-36	8	Şlight latersl bowing	For 3 wks	Normal	Excellent
40 Mrs L K	40	Transverse middle third	2-19-36	2-20-36	8	Excellent	For 2 wks	Normal	Excellent
4r Mr O O	57	Lower third refracture of bone cyst	2-25-36	2-25-36	8	Anterior bowing	No	Normal	Good
42 Mr W M	18	Transverse middle third	4-30-36	4-31-36	4	Excellent	10	Normal	Excellent
43 Mr G H	45	Communition with marked separation middle third	6- 6-36	6- 7-36	5	Poor	No	Normal	Good
44 M185 M B	25	Transverse middle third	8- 6-36	8- 7-36	5	Excellent	No	Normal	Excellent
45 Mr L I	16	Transverse middle third	8- 7-36	8- 8-36	4	Excellent	No	Normal	Excellent
46 Mr J K	62	Transverse middle third	8-10-36	8-11-36	6	Good	No	Normal	Good
47 Mrs M M	28	Lower third oblique comminuted	9-12-36	9-13-30	9	Slight lateral bowing	For 2 wks	Normal	Excellent
48 Mr 4 U	7	Oblique through a large cyst in middle third	9-18-36	9-19-30	3	Excellent	No	Normal	Excellent
49 Mr A M	35	Irregular transverse middle third	10~28-36	10-28-30	_4_	Excellent	For 3 wks	Good	Excellent

used to determine the position of the fragments in the cast

A number of patients who had had casts applied, especially those with acute flexion of the elhow, were observed daily during the first week for swelling and cyanosis of the hand. If these symptoms appeared, they were televed hy splitting the cast. Patients were then observed at 2 week intervals, and the position of the fragments was determined by x-ray examination. Casts were applied for periods varying from 3 to 9 weeks.

Anatomical results were satisfactory in all cases except one hadly comminuted fracture (Case 43). Two types of deformity, lateral howing and anterior bowing, occurred frequently. The former occurred more commonly in fractures of the middle third and a combination of the two in fractures of the lower third. Lateral bowing occurred when the proximal fragment was displaced laterally, usually hecause of a large breast or a harrel shaped chest. Lateral bowing was readily corrected by the application of a small wedge to the cast at the inner side of the elbow (Fig. 2). Anterior bowing was neutred when the forearm

was permitted to drop, this was corrected by shortening the wrist neck slung. Even when the humerus was in excellent position in the cast, it was necessary to observe the patient at r or 2 week intervals hecause of a common tendency to remove or lengthen the wrist neck slung and thus permit anterior howing. Even intelligent patients required watching. Early active motion was encouraged in the shoulder, wrist, and hand

Functional results were excellent in all cases, a normal shoulder and elhow being obtained

In any discussion of the results of treatment of a fracture of the shaft of the humerus, the cosmetic result must he considered as seriously as the anatomical or functional result. In heavily muscled arms, deformity due to excess callus, angulation, or poor apposition, may he well concealed. However, children and most adults usually have such thin heeps, hrachials and triceps muscles, that any asymmetry or prominence at the fracture site is easily seen. The appearance of an extremity is the first concern of the patient when the cast is removed, often it is the most important one. Perhaps no factor will cause the patient to seek, the services of another doctor.

TABLE IV -- FRACTURES OF THE MIDDLE AND LOWER THIRD OF THE SHAFT OF THE HUMFRUS IN POOR POSITION

-												
_		٠.		Age	Date of injury	Type of feetlu e	Corrects a price lune	Number of weeks an casa	I nal x ray	Phys > therapy	Function of elbow an I shoul ter	Cosmetic
50	Mr	TI	2	10	12-15-35	Tran verse x such overreding	Vanipulation with I scal annuchetic hanging cast		L cellent	No	Normal	Normal
21	Me	.]	MI	35	a-1g-46	Transverse z inch linear separats n	Two manipulations under general anesthesia hang no cast	£	Lower fragment displiced anterior by	10	Aormal	Good
54	Mr	s]	D	31	2~35-36	Transverse 2 mch overriding	Vampulation without anesabetsa hanging on t	8	Lower fragment antersor	λo	Normal	Good
5.3	Mr	H.		35	3-14-36	Tran verse a inches overriding	Manipulation without anesthesis hanging cast	В	Good	No	Normal	Excellent
34	Mr	4.5		46	4 20-36	Oppliane mey over	Manipulation without antestheria hanging cast	S	Good	No	Normal	Excellent
55	Mi	5 V I		59	7 11-36	Oblique s meh fateral separation	Open reduction banging ca t	6	Antenot angula tion Excessive callus	For 1 ma	Excellent	Fair
36	Mr	, B	Ħ	26	7-10-36	Spiral oblique with anterior angulation	Manapulation without anesthesia hanging cast	6	Excellent	For 1 ma	Vormal	Excellent
\$7	Mr	R	4	25	4-18-50	Spire? oblique, in partial apposition	Manipulation without apenibesia hanging east	4	Excellent	No	Normal	Excellent
35	Vi	D	c .	13	8-18-16	Transverse with inch overriding	Vanipulation without anesthesia hanging east	٠	Slight interal angula t on	10	Normal	Fair

and perhaps of a lawyer as readily as a deformed extremity following a fracture. We have, there fore included a description of the cosmetic result obtained in the cases herein reported. Two cases will be discussed to illustrate the importance of this factor. Normal appearance of the arm was obtained in 13 cases slight boning or excess callus gave a less satisfactory appearance in 3 cases (41 43 and 46) A good cosmetic result despite a poor roentgenograpfucal appearance was obtained in Case 43 because of heavy muscles, the patient was well pleased. A young lady with a transverse fracture of the mid shaft was observed for a 12 week period before much callus appeared Becoming overconfident she dispensed with the wrist neck sling despite frequent and careful warnings Obvious anterior bowing was incurred, our offer to correct the deformity under anesthesia resulted in the patient leaving the clinic Had the simple instructions been followed, an excellent result would have been obtained Frequent super vision is necessary for this type of patient

One patient (Case 44) had a radial nerve parallsis, despite an excellent reduction of the fracture No other complication was observed

Union occurred in all, a surprisingly short time
was required in most cases for good callus and

partial union Physiotherapy was given a few

patients for short periods (Table III)

Nine fractures involving the shaft were dis
placed, overriding, angulation poor apposition,
inear and lateral separation, occurred in this

group All but one fracture occurred in adults. At first, manipulations were carried out inder general or local anesthessa our experience has been that fractures of the shaft can usually be manipulated with no anesthetic, if the patient has the least desire to co-operate. Indeed, in one patient (Case 33) a distraction of 2 meh was obtained by manipulation under anesthesias. Six fractures were manipulated without anesthesia. One open reduction was performed.

One open reduction was performed Manquidations were carried out with the patient on a fluoroscopic table. A flannel hand passed through the fleved elbow and about the body of an assistant facilitated careful traction. Plaster was applied to the infracture site and to the forearm when the fluoroscopic examination showed a good reduction. Marked flevion of the elbow was necessary to maintain reduction in transverse fractures of the lower third of the shaft Folloning 1719; examination, the patient was observed at 2 week intervals. Casts were applied for periods varying from 5 to 8 weeks.

Anatomical results varied One patient (Case 58) obtained a less satisfactory result because of her refusal to return for examinations Cosmetic results were satisfactory

Union occurred in all cases Little physiotherapy was required There were no complica-

tions in this group

This warning may be repeated, lateral bowing and anterior bowing are two deformities most to be avoided (Table IV)

SUMMARY

- r The use of the "hanging cast" has been found efficient in the treatment of most fractures of the humerus
- 2 A report is presented on the results of treat ment by use of the "hanging cast" in 58 consecutive cases in year, of fractures of the neck and shaft of the humerus
- 3 Badly communited fractures of the head and fractures including the condyles or the supracondylar area are not considered suitable for this method of treatment
- 4 The reduction of displaced fractures is accomplished before application of the cast
- 5 Ån interpretation is given of the terms "excellent," "good," "fair," and "poor' used in this discussion. The fractures are grouped according to location
- No attempt is made to immobilize the fracture site, notwithstanding which there have been no cases of delayed or non union
- Twenty-three fractures of the upper third of the shaft and of the neck are described and the satisfactory results noted

- 8 Twenty-five fractures of the lower twothirds of the humerus were treated by the use of the "hanging cast" with satisfactory results
- 9 The application of a plaster wedge to the inner side of the cast in certain individuals prevents lateral angulation
- ro In caring for a fractured humerus in a non-co-operating patient some other form of treatment is advised
- rr Early motion at the shoulder and wrist are insisted upon and results in nearly normal joint motion and muscle development upon removal of the cast
- 12 Following removal of the cast, physiotherapy was used in but 20 of the 58 cases. This was found to be most consistently indicated in fractures occurring at or near the surgical neck of the humerus, in which there had been marked displacement of the fragments at the time of fracture
- 13 The use of the "hanging cast" reduces hospitalization to a minimum

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PRIMARY CARCINOMA OF COWPER'S GLAND

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URGICAL diseases of the Cowper glands have received but scart attention in unit logical practice, in fact, pathological conditions of these two minute organs up to the present time have been regarded as rare Therefore, it is not surprising to find, upon looking over the literature of the subject, that only 5 cases of primary carcinoma of the Cowper glands are on record.

The frequency of pathological lesions of thebulbo-urelthal glands must certainly have been underrated, since their anatomically strategic position in the perincum at the level of the membranous urethra, where their lubricating ducts open readily invites ascending infection in the most common type of urethritis prevalent in the male

In genecological practice infections of the Bartholm glands the homologues in the female of the Cowper glands in the male are of quite com mon occurrence and many cases of primary can cer of these glands have been reported Chrucal experience reveals however, that it is rather un usual for pathological conditions to be discovered primarily in the Cowper glands, either because their pre operative diagnosis is seldom made, or because they are mistaken for some pathological condition of the urethra or prostate, and the true nature of the affection is often not recognized until after the operation when histological sections are made of the specimen removed. In fact there are many cases in which no specimen is obtained and the histological examination is not made

The purpose of this study is to bring out the chinical importance of these pathological conditions of the lower urinary tract, which may be encountered in routine urological practice and which in man instances produce not only obstructive uropathies but also genital disturbances, demanding early surgical relief—conditions sufficiently common to make it important for the general surgeon and the urologist to bear them in much when making a diagnosis

This communication is based on the report of one personal case of primary carcinoma of Conper glands diagnosed and operated upon by the author, with a review of the literature, and presented in the hope that this work will stimulate further research in this important field

HISTORY AND LITERATURE

It appears that the two small organs commonly known as Cowper's glands were in reality first briefly described by Mery, a French surgeon, in the Journal des Sarants of June, 1684 The ongs nal description, which amounted to something less than five hoes spoke of "two small glands the size of a pea, which he bad seen lying under the male organ, beneath the accelerator muscles. about a thumb s distance from the body of the prostate, and about 2 lines apart from each other" These structures could, of course, be nothing else than the bulbo-urethral glands, to which Cowper independently called attention in 1600, and of which he gave a more detailed de scription in 1702 Although certain French writ ers have assiduously tried to maintain the bri onts of their own countryman's discovers, by calling them "Mery's glands, it seems that Mery himself pever pressed the matter and made no protest when Littre (1700), Morgagni and other contemporaries began to refer to them as Cow per's glands--a name that has now become in separable from these organs. They have also been called ' the glands of Duverney, who mistakenly <poke of them as "inferior prostates ' others of</p> that period termed them small prostates," adstiti conglomerati 'accessory prostates, (Terraneus, 1700) anuprostates (Winslow) and "round mucous glands" (Haller)

During the 18th century there was considerable confusion as to their number and their exact loca tion with reference to the prostate and the methra. Cowper, after describing two glands at the outset decided later that there were three and in this conclusion he was upheld by Lieutaud (1742) and Mauget (1716) both of whom thought they found something similar in one or two cases This led Cruveilluer to make a very detailed search for a third gland but in the end that author announced that he could find no sign of any such structure. It seems probable, according to Guebler, that what Cowper and the others saw were accessory glandular granules such as some times are found accompanying the excretors ducts from the normal Cowper's glands, lying within the corpus spongiosum of the urethra Comper, in one of his drawings, it is true, showed an isolated duct coming from the third gland but as he failed to state in how many subjects he

observed this duct, we must conclude that its existence is exceptional and must be regarded as

an anomaly

Guebler, in 1849, published in a Paris thesis the most extensive study of "Mery's glands" (as he insisted on calling them) that had yet appeared,a remarkable work embodying an exhaustive search of the literature of the subject as well as his own personal investigations carried out on 20 cadavers. It is to him that we are indebted for what is even today the most complete and authoritative account of the anatomic structure and topographic relations of these glands With reference to their pathology, be wrote that "while nothing bad been written except on inflammations and obliterations, there could be no doubt that with further study it would be found that they are subject to all the changes and diseases that other organs suffer,"-a statement well borne out by modern observations

Guehler's work formed the basis for a comprebensive thesis from the pen of Lebreton in 1904, which brought the pathology of the glands up to date, and devoted many pages to a clear expos-

tion of acute and chronic comperitis

A study of the literature up to the time of Lebreton reveals reports of only 3 cases of primary carcinoma of Cowper's glands These were recorded by Paquet and Herrmann (1884), Pietrzikowski and Gussenbauer (1885) and Kocher and Kaufmann (1886) In recent years two more proved cases of this rare type of cancer have been reported, namely that of Di Maio in 1028, and that of Uhle and Archer in 1035 In one additional case reported by Blanc, Wies, and Carret (1010), a clinical diagnosis of primary carcinoma of Cowper's gland was made, but as the patient refused operation and was not seen again, the case, although of great interest, can unfortunately not be counted as authentic since it lacked histological confirmation

Other important contributions in modern times to the study of Cowper's glands have been made by such German writers as Englisch, Elbogen, Halle and Motz, Hertwig and von Lichtenberg, in Belgium by Hogge, in France by Hartmann and Lecene, by Delbet, Pasteau, Nogues, Reynes, Leszcynski, Papin and Vafiadis, Luys and others, in the United States by Young, Keyes, Hinman, Lowsley and Kirwin, and Walters, and, more recently, by Uhle and Archer, who reported the first case of primary adenocarcinoma of the Cow-

per glands in America

To the 5 cases in the literature in which the presence of primary carcinoma of Cowper's glands was proved by examination of the specimen, I am

here adding a sixth case of this very rare condition which I have recently had the opportunity of observing

ANATOMY OF COWPER'S GLANDS

The Cowper glands are two small round or oval glands, frequently flattened, lying in the urogenital floor between the two layers of the median permeal aponeurosis, and between the deep surface of the bulb and the superficial surface of the membranous urethra, at the level of the triangular ligament and the apex of the prostate. In some individuals one or both of these glands may be lacking Thus, Lebreton reports that, in a total of 15 fresh specimens examined, he saw both glands clearly in 9, in 4 be saw only 1, normally the gland on the left side, and in 2 neither gland at all could be found. Their size varies from that of a hempseed in the newborn to that of a cherrystone or hazelnut in the adult. When the average glands are developed they are usually separated by a space of 4 to 5 millimeters (Sappey), but if larger than the average they may encroach upon one another and even present the appearance of a single large gland, sitting astride of the membranous urethra (Fig 1) The two glands may be of the same size, but not infrequently the left is larger, suggesting a possible anatomic reason for the greater frequency of cowperitis on the left side Deviations from the typical form, size, and position abound

The glands are nucous, tubo-alveolar structures, racemose in their arrangement, they are of firm consistency, which renders them easy to grasp with the ingers before their complete dissection. Their terminal divisions, after a certain amount of branching, end in irregularly sacculated compartments. After denudation they are reddish in color when first seen through the very close capillary network that surrounds them, when this is removed they are yellowish, and very easy to recognize. They contain a clear and viscay to the control of the co

cous secretion of alkaline reaction

The excretory ducts that drain the glands are usually about 3 to 4 centimeters in length, and about 15 millimeter in diameter. Leaving the glands in a forward and median direction, they plunge into the bulb, through which they pass obliquely on their way to the urethra, which they approach very gradually, they finally become submucous and, after a tract of varying length, obliquely pierce the mucous membrane itself We can, accordingly, distinguish two portions of the duct (1) an intraspongious portion and (2) a submucous portion, the second being as a rule two or three times as long as the first. The ducts

tend to become tortuous at the point where they enter the urethra through two small slit like on fices (Fig. 1), which may be difficult to see, especially in young subjects. Frequently one dust is considerably longer than the other, in which case the onfices are in the same anteroposterior but not in the same transverse line.

Microscopically, the alvool of the glands are med with low columnar or pynform cells, with mucus secreting elements present in great number. The diverticula of the gland are united by intertubular connective tissue and are mested with a fibrous envelope containing both smooth and striped muscle fibers derived from the compressor urethrae muscle. The glands receive their blood supply from branches of the attents of the bulb which terminate in capillaries that enclose the alveol and diverticular.

EMBRIOLOGY

The Cowper glands are formed from the uro genital sinus at an early stage of embryonic life, and are the homologue in the male of the Bar

tholin glands in the female

The embryological study of these gfands dates from 1840, when Tiedman reported that he saw them in embryos of 5, 6, and 7 months Since his time numerous authors have engaged in their study, and the date of their appearance has been carried back to as early as the tenth or eleventh week of embryonic life (Hoffmann, 1877) Mueller (1892) concluded that their first appearance is irregular as to time, and that it may take place in embryos from 4 to 8 centimeters in length. He states that the anlagen of both these glands arise first as solid buds from thickening of the epithe hum of the urogenital sinus, which later on acquire a lumen Lichtenberg in 1006 found gland buds unbranched in a 65 millimeter embryo, afthough both contained lumens, small lateral buds indicated the site of future branching. In an embryo of 70 millimeters an accessory Cowper's gland was present

Eggerth (1915), who has given us a very detailed account of his observations, states that human embryos, both male and female, of 3 to 6 centimeters crown breech length, present 3 pairs of lateral folds on the wall of the urogenital suns, which in the vounger stages extend from the ostum urogenitals to a point about halfway to the place where the mesonephric duets enter the suns. They appear first as sold epithelial indiges or folds, arranged symmetrically on the two aides of the urethral plate. In embryos of only 3 centimeters' length he was able to observe the anfagen of Cowpers and Bartholin's glands as sold epithehal buds arising from the median lateral fold mear its cephalic end. When the embry o reaches a length of about 45 centimeters, the distal portion of the bud develops a knobbke end with a narrower proximal portion in which the begin nugs of a lumen can be seen. At 5 to 6 centime ters there is evidence of distal branching of the anlage, cross sections of the gland showing a partial division into 4 or 5 branches, each of the abo preducing a lumen. He noted that the development of the glands on the 2 sides is not symmetrical either as to time or evetting forowth.

Johnson made wax models of the Cowper glands as he observed them in early embryos (Fig. 2). He traced the developments of the urcthra and its various glands from the embryo of 55 millmeters to that of 220 millmeters, and demonstrated that the beginnings of Cowpers glands are already present in a stage at which

the bulb itself is not yet apparent

Anomatics of the Cowper glands are already
observed in the fetal stages. Johnson found them
in 3 of its embry os from 55 millimeters to birth.

In I case the duct of the right side alone reached
the urethra, the left being a branch of it which
crossed the midline to reach the gland body. In
the 2 other cases, the right and left ducts, respectively, were occluded at their outlets, resulting in
a cystic condition from distention. There is no
doubt that such anomalies may be responsible for
pathological conditions of the Cowper glands
appearing in adult life.

TUMORS OF CONTER 5 GLANDS

The Cowper glands have until recently been so little known that their diseases, if we except cowpentis, have hardly appeared in the text books, but it is now recognized that they are sub ject to the same general processes of pathology as other organs of the body The most important of these are (1) acute and chronic compenies, (2) cystic formations (3) tuberculosis, (4) calculosis and (5) tumors Our concern here is with the last named group alone Lebreton in 1903 found records of only 3 cases of primary malignant tumor of Cowper's glands in the hterature These, as we have seen were the cases of Paquet and Herrmann (1884), of Pietrzikowski (1885), and Kocher (m Kaufmann) (1886) In all these cases the existence of epithelial malignant tumors that had developed from the substance of Cowper's gland was established beyond question (Fig 3) In every one the histological examination proved that the turnors were carcinomas that is, atypical epithehomas developed from the epithelium of the acms of the gland their structure recalling

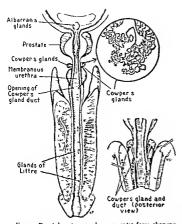
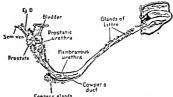


Fig 2 Frontal section in diagrammatic form showing the topographic relationship of the Cowper glands and their ducits to the membranous portion of the urethra, also the interrelationships of the different urethral glands at vanous levels of the urethra. The circle on the right is a ramphic representation of the racemose internal structure of the glands of Cowper. The drawing in the lower right comer is a schematic view of the posterior portion of the bulbomembranous urethra indicating the anatomic post unto of the Cowper glands and their corresponding ducts as they empty into the membranous urethra. (Modified drawing from Testut, Sappey, Tolki and others.)

absolutely that of a cylindroma. The histories of the second and third cases would seem to indicate that such tumors are of very great malignancy. In the second case, the subject was a youth only 19 years of age. In none of these cases was the evact diagnosis made previous to surgical intervention.

In 1910 Blanc, Wies, and Carret reported a case on which they were not permitted to operate, but which was clinically diagnosed by them as carcinoma of Cowper's gland, on the basis of a hard, painless, infiltrated masslying in the median permeal region, unaccompanied by any urnary disturbances, but associated with a few hard, painless nodules in both groins. However, as the patient refused operation and left the hospital after 6 days' observation, this case can, unfortunately, not be counted among verified instances of carcinoma of the Cowper glands.



Fir 2 Reconstruction of the glands of the urethra in a wax model from an embry, a fiter Johnson, showing the anatomical position of the Cowper glands and the Cowper ducts at the level of the membranous urethra in an early stage of embryonic life

In 1028 Di Maio reported a fourth case, confirmed by biopsy, in which a malignant growth of the Cowper gland was present. Here there were no symptoms within the urinary tract and the endoscopic findings were negative. There was no external tumefaction, but, upon rectal examination, a large mass could be felt. The patient was a cavalryman who was used to sitting in his saddle all day, and as the growth went on the discomfort of this amounted to torture. This pain and the appearance of urethral hemorrhages brought him for examination earlier than he might otherwise have come, and thus made possible the diagnosis, at a comparatively early stage, of a malignant growth associated with hemorrhagic cysts of Cowper's gland

Quite recently (1935) Uhle and Archer have reported a fifth proved case of carcinoma of Cowper's gland which they observed in Randall's service in Philadelphia Here the patient was only 32 years of age, and the case was marked by the finding of a normal prostate, a complete absence of unitary symptoms, and the presence of Inite-like pain in the rectum, leading to the discovery of a firm, tender nodule just inside the internal sphincter Histological examination of the excised tumor mass revealed an adenocarcinoma of the Cowper glands

To these 5 cases I am now adding a sixth case that has recently come under my notice, and upon which I have had the opportunity to operate

REPORT OF AUTHOR'S CASE

A case of primary carcinoma of the Cowper glands in a man 70 years of age, who had been suffering for over 40 years with a gentio urinary condition which had been erroneously diagnosed on several occasions and for which he had undergone extensive treatment, including several operations without relief. He was born with a right undescraded testis and a very small meatus, for which a meatot tend to become tortuous at the point where ther enter the urethra through two small left like onfices (Fig. 1), which may be difficult to see especially in young subjects. Frequently one duct is considerably longer than the other, in which case the onhices are in the same anteroposterior but not in the same transverse line.

Microscopically, the alveol of the glands are lined with low columnar or pyriform cells, with mucus secreting elements present in great number. The diverticult of the gland are united by intertubular connective tissue and are unested with a fibrous envelope containing both smooth and striped muscle fibers derived from the compressor urethrae muscle. The glands receive them blood supply from branches of the attences of the bulb which terminate in capillaries that enclose the alveol and diverticular.

EMBRY OLOGY

The Cowper glands are formed from the urogenital sinus at an early stage of embryonic life, and are the homologue in the male of the Bar

tholin glands in the female

The embryological study of these glands dates from 1840 when Tiedman reported that he saw them in embrace of a 6, and 7 months. Since his time numerous authors have engaged in their study, and the date of their appearance has been carned back to as early as the tenth or eleventh week of embryonic life (Hoffmann 1877) Mueller (1802) concluded that their first appearance is irregular as to time and that it may take place in embryos from 4 to 8 centimeters in length. He states that the anlagen of both these glands are first as solid buds from thickening of the epithe hum of the urogenital sinus, which later on acquire a lumen. Lichtenherg in 1006 found gland huds unbranched in a 65 millimeter embryo although both contained lumens, small lateral buds indi cated the site of future hranching. In an embryo of 70 millimeters an accessory Cowper < gland was present

Eggerth (1913) who has guen us a very detailed account of his observations, states that buman embryos both male and female, of 3 to 6 centimeters crown breech length present 3 paus of lateral folds on the wall of the urogenital smus which in the vounger stages extend from the ostum urogenitals to a point about halfway to the place where the mesonephric ducts enter that smus. They appear first as solid epithelial ridges or folds, arranged symmetrically on the two sides of the urethral plate. In embry os of only 3 centimeters' length he was able to observe the anlagen of Covners and Bartholin s glands as solid epitthehal buds ansing from the median lateral fold near its cephalic end. When the embry reaches a length of about 4.5 centimeters the distal portion of the bud develops a knoblike end with a narrower proximal portion in which the beginnings of a lumen can be seen. At 5 to 6 centime ters there is evidence of distal branching of the anlage, cross sections of the gland showing a purtual division into 4 or 5 branches, each of these also preluding a lumen. He noted that the development of the glands on the 2 sides is not symmetrical either as to time or extent of growth

Johnson made wax models of the Compreglands as he observed them in early embryos (Fig 2) He traced the developments of the urethra and its vanous glands from the embryo of 55 millimeters to that of 2-0 millimeters and demonstrated that the beginnings of Compers glands are already present in a stage at which the bulb itself is not yet apparent.

Anoralies of the Cowper glands are alreadobserved in the fetal stages Johnson found them
in 3 of 15 embryos from 55 millimeters to birth
In 1 case the duct of the right side alone reached
the urethra the left being a branch of it which
crossed the midline to reach the gland body. In
the 2 other cases, the right and left ducts, respectively, were occluded at their outlets, resulting in
a cystic condition from distention. There is no
doubt that such anomalies may be responsible for
pathological conditions of the Cowper gland
appearing in adult life.

TUMORS OF CONPER 5 GLANDS

The Cowper glands have until recently been so little known that their diseases, if we except compents have hardly appeared in the text books but it is now recognized that they are subject to the same general processes of pathology as other organs of the body. The most important of these are (1) acute and chrome cowpents (2) evstic formations (a) tuberculosis (4) calculosis and (5) tumors Our concern here is with the last named group alone Lebreton in 1905 found records of only 3 cases of primary malignant tumor of Cowper's glands in the literature Thee, as we have seen were the cases of Paquet and Herrmann (1884), of Pietrzikowski (1885) and Kocher (in Kaufmann) (1886) In all these cases the existence of epithelial malignant tumors that had developed from the substance of Cowper's gland was established herond question (Fig. 3) In every one the hi-tological examination proved that the tumors were carcinomas that is atvp cal epitheliomas developed from the epithelium of the acmi of the gland, their structure recalling

possible malignant growth of the Cowper glands. The prostate, which was enlarged to shout three times its usual size, was situated far behind these hypertrophic masses of the Cowper glands, and was of letther; consistency and adenomatous in type. The right and left seminal vesicles were slightly palpable but apparently normal. No prostatic fluid was obtained for microscopic examination. The urner test showed the first glass clert, with shreds, second glass clear, third glass haz; The urethra was permeable to a No. 14 silk catheter, and a No. 20 French sound which was passed with slight difficulty. The patient had a ounce of residual urne. In view of the mixthed sensitivity of the urethra further instrumentation was postponed in order to relieve the acute symptoms from which he was suffering

Impression (1) Right undescended testis (2) Chrome conpertus with marked hypertrophy and induration of these glands accompanied by cysts and stone formation, with possibility of a malignain growth (3) Adenomatous hypertrophy of the prostate (4) Stricture of the urichra

It this time the patient refused operation and was satisfied to recue pallatine office treatment of his utologic conditions, although he was informed that the Covper glands, which were responsible for all the unnary and rectal symptoms with which he had been suffering for so many years would sooner or later in volve the external sphincter of the urethra and induce an attack of complete retention of unne (Fig. 3)

On Sunday March 20, 1036 the expected attack of retention came I was called early in the morning by the patient's wife who stated that her husband was mable to unrate and had been suffering intensely all night with pain in the suprapulor region and marked bladder and rettal tensemus After I had relieved the acute retention of urine I proposed a consultation with his family physican and also with another urologist to substantiate my

findings which was agreed to

Roentgenographic and urographic examinations were carried out The plain thim was entirely negative with reference not only to Cowper's gland pathology but to shadow indicative of stone anywhere in the unnary track. After the intravenous administration of 20 cubic central contents of 10 page, x ray pictures were taken revealing that both kidneys had good eliminatory function and that they were normal in size shape and position. The pelves, ure ters and bladder were also well outlined and normal urethrocystograms in both anteroposterior and lateral views disclosed that the entire lumen of the urethra and the bladder were distended with the opaque substance but were negative to the presence of pathology in the Cowper glands.

April 1 1936 After making a rectal examination Dr Alfred T O-good, called in consultation agreed with my fladings that the attack of acute retention of urms might have been due to this hypertrophy and industron in the Cowper glands and wholly independent of the prostate fle also recommended that the patient be hospitalized with a retention catheter and that these hypertrophied industated Cowper's glands be removed by way of the perineum The family physician Dr Laurence W Whittemore afso agreed with this recommendation and the pitient was finally admitted to the hospital for operation

The interior of the bladder was found negative on cysto scopic examisation except that there was a smalf amount of bulbous edema at the floor of the bladder neck probably caused by the retention catheter. Upon withdrawing the instrument a slight lateral prostatic intrusion was seen, indicating a moderate degree of prostatic hypertrophy, but not sufficient to account for the obstruction. The rest of the urethra was carefully evanimed and was apparently

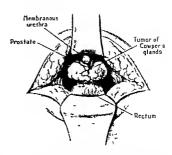


Fig. 5 Operative technique of perincal cowperectomy, showing the initimate relationship of the infiltrating turns mass of Cowper's glands strongly adherent to the rectal wall and to the membranous portion of the urethra. Uter total removal of this indiurated mass by the perincal route the prostate lay directly behind separated by Denomil their sfacts which served as a plane of cleavage to prevent invasion of the prostate by the malignant growth thus in dicating the value of early perincal total cowperectomy

negative The two orifices of the Cowper glands ducts were not seen. With these negative cystoscopic findings the patient was prepared for the operation of perineal cowpercetomy.

TECHNIQUE OF PERINEAL COMPERECTOMY

After administration of spinal anesthesia the patient was placed in the exaggerated lithotomy position as in perineal prostatectomy. With the usual preparation the long seminal vesicle urethral tractor was passed into the bladder without difficulty, a curved incision was made in the permeum, from one ischial tuberosity to the other between the scrotum and the rectum. The in cision was carried deeper on each side of the midline into the ischiorectal fossa, by blunt dissection, the central tendon was then divided. allowing the bulbar portion of the urethra to be retracted, and some remaining fibers of the rectourethralis muscle were dissected and cut with scissors At this time it was recognized that there was a considerably indurated and hypertrophic mass of tissue which occupied the entire floor of the penneum, and which because of its close attachment to the membranous bulbar portion of the urethra and to the rectal wall was quite difficult to isolate A finger was then inserted into the rectum to serve as a guide during the further dissection of this hardened and almost calcified tissue and also to protect that viscus



Fig 6 Photomicrograph of an area of the perimen removed at operation revealing an atypical neoplastic proliferation of the acinous portion of the Lowper glands ×20

from injury. After slight difficulty in advancing the dissection a perineal retractor was placed in the perineum to give proper protection to the tectal wall: the index finger was withdrawn from the rectum and the glote swere changed. At this time clamps were placed here and there to stop bleeding and linguiries were made.

With further dissection of the perineum, the tumor masses that were attached on each side of the rectum were separated and entirely freed from their attachment to the wall of the rectum (Fig. 5) These two masses were about the size of two large olives of irregular shape, and hard as a rock they appeared to be surrounded by cyst formation and some calcufications. While an Allis clamp was being placed in the growth, a few drops of green pus were seen, of which cultures were made. These hard masses were clearly separated from the prostate gland, and although close to it were not in the least attached to it It was evident that there was a perfect bne of cleavage between this growth of the Cowper glands and the prostate itself Apparently the prostatopentoneal aponeurosis, or Denonvillier's fascia was acting as a diaphragm or protecting membrane to prevent the invasion of the prostate gland Although this growth was firmly attached to the membranous urethra where the Cowper gland ducts were anatomically situated, the urethra itself had not been invaded. After the hard tumor masses of the Cowper glands were entirely removed and a total cowperectomy accomplished the prostate could be felt all the way around, showing that there were no adhesions to the rectal wall However as there was some induration on the posterior and right lateral lobe

it was decided to remove a piece for histological examination, otherwise the prostate gland was not disturbed. At no time during the procedure was the membranous urethra opened or injured

After proper cleansing and insertion of a few hot compresses to stop oozing, the wound was re examined to assure that no pieces of the growth of the Cowper gland had been left behind after which with the clinical impression of definite ear cinoma of Cowper's glands it was closed in the usual manner The floor of the permeum was closed, bringing the two levator ani muscles together with chromic catgut sutures, and the skin was closed with interrupted silk worm gut sutures a cigarette drain being placed on the right side A retention catheter \o 22 was then passed into the utethra without difficulty the bladder was strigated and the return fluid was pinkish but rather clear. The catheter was fixed in position and the patient returned to his room in good condition

The patient's considerence was unscentful up to the such day the perment sound was drassed daily the packing was removed at the end of 48 hours, the catheter are justed daily with their nutrie 1 to coop and not be with day removed, mer the patient was complaining of pain in the urethra. The stitches were removed on the 11th port operative day and the perment wound which was healthly and dean was packed pighty with balazing of Pert to stimu.

late granulation and prompt healing of the entire wound April 16 1936 Twelve days after operation while the attent was recuperating from his perineal comperectomy he suddenly developed a chest complication in his left lung for which Dr Whittemore Dr William R. Williams, and Dr James Morley Hitzrot were called in consultation The first x ray films were negative a days later x ray films were reneated and showed the presence of fluid in the left pleural cavity which went on to the formation of an empyema Afte a different tappings each of which cherted some 100 cubic centimeters of pas a thoracostomy was done by Dr Hitzrot under local anesthesia on April 18th and a large rubber tube was introduced into the lung for drainage. The patient bore the operation well, but on the following day his condition became worse. Innumerable attempts were made to save his life but all proved vain and on April 26 death supervened as the result of general sepsis arising from the emprema. The perimen removed at operation consisted of several pieces of hard indurated glandular tisne which corresponded to the firm's adherent and infiltrated growth removed from the permeum and submitted to the pathologi t for histological examination. The report of the pathologist, Dr James Lwing ubmitted on April 13 1936 was of great interest, in that the microscopic study showed an infiltrated, malignant grade a plus adenocruy snowes as manteacte, magnesin grace 2 pros actions conclusions understand parts of the Cowper gland material submitted with a slight tendency to the development of cysts within the growth of papillary adeocatemoma (Figs 6 and 7) Vany of the areas of the neoplastic mass showed very wide adenocarunomatous acrus ditended by a network of spethelial strands. In some areas there were clongated papillary structures with thin trand of stroma lined by opaque cubical epithelium with atypical features not met with in prostatic cancer. In another area the tumor took the form of very numerous small regular acmy

hned by opaque cells. In other portions there were peculiar compact medium sized acim, lined by rather large granular cells. On the whole, Dr. Ewing said the structure of the adenocarcinoma was quite consistent with an origin from the Cowper glands.

Pathological diagnosis adenocarcinoma of Cowper's

The study of this case report suggests several possible hypotheses with reference to the underlying ettology responsible for the formation of primary adenocarcinoma of the Cowper glands It serves also to bring out the difficulties in diagnosis and to point out the many years of suffering and unnecessary surgical treatment which this patient had undergone because of erroneous diagnosis.

First of all, it appears that the "orthostatic albuminuria" from which he was suffering in his early youth and on account of which he was rejected in a life insurance evamination for Bright's disease, was nothing but the presence of mucin coming from an undiagnosed cowperitis It is logical to assume that in cases of cowperitis following urethritis the Cowper glands will excrete an excess of glandular fluid, and, as Henle and other early investigators have demonstrated, the fluid from the Cowper glands contains an excessive amount of albuminoid substance, which can he readily detected in a routine urinalysis In this instance this was clearly the case, for the patient lived to be 70 years of age and the in travenous urograms that I took revealed that both kidneys were entirely normal. It is obvious that the symptomatology in these cases is often misleading, particularly when these patients most commonly complain of rectal symptoms and go first to the family physician and the proctologist for relief This case history reveals that the patient had had 3 operations for hemorrhoids and 2 dilatations of the rectum made under general anesthesia in the last 10 years, when in reality the underlying cause of his trouble was the presence of an undiagnosed pathological condition of the Cowper glands

An analysis of the 5 cases collected from the literature and reported in resume in the attached table (Table I) reveals that all of these patients with primary carcinoma of Cowper's glands are complaining of a syndrome characterized mainly b pain in the rectum, a tumor mass in the perineum and presence of urinary disturbances, for which they finally come to the urologist for examination

Although the etiological factors in the new growth formation are at present not definitely known, it can be assumed in this case that, as a result of the pathological changes produced by



Fig 7 Photomicrograph of another section of the speci men removed at operation, showing the characteristic fea tures of adenocarcinoma of Cowper's glands × 125

infection of the Cowper glands in early life, there had been an obliteration of the Cowper duct with ectasia and cyst formation, as well as calcification or possible stone formation of the glands and their ducts. The lack of drainage and the persistent interstitial inflammation, together with the absence of any proper capsule of the organs, and the fact of the constant trauma to which these glands are subjected in the perineum, may lead to the formation of a new-growth of infiltrating character, spreading into the tissues of the permeum and the entire periglandular region In 2 of the cases, namely the one reported by Pietrzikowski and my own case, the tumor mass had extended upward and involved the external sphincter, finally resulting in complete retention of urine

The age incidence of these 6 authentic cases was 65, 19, 57, 65, 32, and 70 years, showing that this malignant growth may develop in Cowper's glands at any age

The trauma incident as the primary cause in the etology of the formation of cancer was evident in Kocher's case, since the patient had had a straddling injury of the perineum 12 years previous to the appearance of the tumor. In most of the cases reported the growth was of infiltrating character and was firmly adherent to the bulloomembranous portion of the urethra, as well as plastered to the lower portion of the rectal wall, so that in the surgical treatment, as in the cases of Paquet, Kocher, Di Maio, and Uhle and Archer, dissection of the perineum was very laborious and a partial section of the adherent portion of the bulb to which the tumor was

TABLE I—SUMMARY OF CASES OF PRIMARY ADENOCARCINOMA OF COMPER'S GLANDS COLLECTED FROM THE LITERATURE

Age	luthor	Symptoms	Clancal diagnosis	Pathologic findings	Operation	Result	Remarks	
05	Paquet and Herrmann 1834	Small perineal tumor on palpation 61 ght urinary disturb- ances carly Intense pain on delecation	Hypertrophy of Cowper's gla do	Epitheliona of Cowper's gland	Removal of Couper a glands	Cured (a yes Jater)	Tumor adherent to bulb which was par a ally reverted leav- ing urmany fistula	
í	Pietrzikowski and Gu sen baner 188	Hard tumor about size of egg on pal pation of perineum Late urinary aymp- soms. Retent on Pain on defecation	Hard tumor of perineum	Carrin ma of Couper's glands metasta 5 to gneunalire n	Extra son of tumor of Comper's gland and of inguinal glands	Recurrence within a few months. Death	·	
57	k scher 1836	Pennesi pain worse on sitting or walk ing. Shight di sutia frequency and burning	Hard tumor aurrounding the membra nous grethra an I uprelated to prostate	Cartinoma con tain n d bris of Cowper's glands	Median inciss n along raphe Comperents my mith exit on of part of mem branous srethra	Recurrence 17 months later Small penneal tumor sure of pea removed. Cured for 3 fm	Injury in persoeum 12 years previous 10 appearance of num	
65	D _I Valo	Severe pain in peri neum Hemorrhages from circhira Tu nor of ins itous be- ginning about size of hen a erg dis- cove ed on rectal examinati n	Probable () st of pr state	Aden xarcinoms of Cowper's gland	Wide permenting of the most of the control of the c	All sympt was relieved would closed in 3 was No further report	Tumor was hard urrounded by cysts infiltrature the bulb and flow of perincum	
.5 .52	Uhle and Archer 1935	Sharp ke fe lik puin in rectum 6 months duration marked c nitipat on Fis- tila in and ma 1 in perincum	Tumo mas in periosal regain	Adenyearcznoma of Cowper's gland	Excess n of perineal tumor mass fol- lowed by sudum seeds and deep a say treatments	Good condition 1 year later	Treated for £ pula	
70	Gutierres 93f	Dysuma albuminuma f equency eten tion. Pain in peri neum and rectum tumor mass in peri neum on rectal palpation.	Tamor of Cowper o glands	Adenotareinoma el Cowret s glands	Total peripeal Cowlengtomy	as days afte oper tion death from general sepais following an empyema of pleural cavity	Treated for benever thords structure of urethra prostatic trouble operated upon a times for internal benever though the truck of dilutation of rectum of rectum.	

attached was also removed. It is to be noted that in instances in which the urethra has been opened as in Cases 1 and 5 of the accompanying table a urnary fistula had persisted for some time, which is rather a characteristic feature of all malignant tumors of the perneum and lower unnary tract.

The clinical diagnosis of any pathological condition of the Cowper glands is very seldon made unless one thinks of the possibility of its custence. A tumor of these glands may readily be mistaken for stricture of the urethra, pen urethral or perineal abscess diverticulum of the urethra called exist or stone or tuberculosis not onh of the urethra but also of the prostate. The final diagnosis must be made on the histological section of the specimen removed at operation, as the onh was to establish its authenticity.

Routine roentgenographic examination as well as urethrocystography may be of value in diag nosis of pathological conditions of the Cowper glands, particularly when the Cowper ducts are patent and the condition can be outlined by the injection of a contrast medium. The author recently had an opportunity to see in the Lro-logical Service of the Hupital Cochin of Prof Chevassu in Pans a beautiful case of tubercu loss of the Cowper glands urethrographically diagnosed. Of course in all these cases the routine urethro-stoscopic examination should always be made so that even if a diagnosis of Cowper gland pathology: cannot be reached, it may at least be possible to rule out other pathology the prostatic urethra or at the bladder neck.

The classic routine rectal examination is the most important way of establishing the clinical diagnosis (Fig. 4). It may be helpful to repeat this examination after placing a sound in the urethm so that the entire urethmic anal can be palpated and a Cowper gland condition readily differentiated from any other lesion of the lower urmany tract.

The prognosis of primary cancer of the Cowper glands is very grave. An analysis of the cases reported up to the present time shows that none of them has met the test of a 5 year cure.

As regards treatment, a study of the 6 cases reported in the literature indicates that as soon as the diagnosis is made there should be a total perineal cowperectomy without opening the membranous urethra or injuring the rectum The steps in the technique of this operation, which has been discussed here in detail, are the same as those that the author has used in more than 200 consecutive cases of perineal prostatectomy and semunal vesiculectomy 12 As soon as histological examination of the specimen removed has proved the presence of a malignant growth. the operation should be followed by implantation of radium seeds in the perineum and by deep ray treatments, as was done in the recent case of Uhle and Archer, in which the patient appears to be in good condition a year after operation. In my own case here reported the radiation treatment was not used on account of the tatal complications that developed 12 days after operation

SUMMARY AND CONCLUSIONS

The purpose of this presentation is to place on record a new case of primary adenocarcinoma of Cowper's glands, clinically diagnosed and operated on by the author and confirmed by histological examination

The literature has been reviewed Only 5 previous cases of this kind have been reported, all of which are here tabulated and summarized, to-

gether with the author's case, in Table I

The study has revealed that while pathological conditions of the Cowper glands are rarely diagnosed clinically, their incidence must have been greatly underestimated since the strategic anatomical position of these glands in the perineum at the level of the membranous urethra invites ascending infection with potential sequels of surgical pathology

The symptomatology in carcinoma of the Cowper glands is readily confused with conditions of the rectum and lower urmary tract The cardinal symptoms are pain in the rectum and perineum, tumor mass in the perineum, and urinary disturbances which may go so far as to produce

complete retention

The treatment when the clinical diagnosis is established is the complete removal of the growth by a total perineal cowperectomy followed by implantation of radium seeds and deep x-ray treatment

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The prognosis is very grave, no case having yet met the test of a 5 year cure It may be assumed, however, that with early diagnosis and the institution of proper surgical treatment better results will be obtained

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THE ELLIOTT TREATMENT AS AN ADJUNCT TO OPERATION IN SIGMOIDAL DIVERTICULITIS

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T IS generally accepted among surgeons that the management of diverticulitis of the colon in its surgical phases is a most difficult problem Especially is this so if the process be complicated by a fistula between the colon and bladder Dr W J Mayo, in discussing vesicocolonic fistulas, said "I know of no more trying operations than some of this character ' Because of the marked inflammatory reaction which is commonly present in the involved sigment of the colon, as well as in the adjacent tissues, primary resection of the affected portion of the bowel cannot usually be safely performed Therefore, complete diversion of the fecal current by means of a primary colostomy for the purpose of placing at rest the inflamed segment of the bowel is commonly, for reasons of safety, a necessary procedure By placing the affected segment of the colon at rest for several months, it has been our experience that marked subsidence of the inflammatory reaction usually occurs. In a few instances the subsidence of the inflammation in both the pericolonic tissues and in the colon itself is so complete as to permit the closure of the colonic stoma without inducing a reactivation of the inflammatory process. However, in the great majority of cases the subsidence of the inflammatory process is not complete but is sufficient to permit resection of the affected portion of the bowel In still another group of cases, fortunately small, there occurs no apparent subsidence of the inflammatory process, even after the bowel has been placed at complete rest for many months Recently, several months after a colostomy had been performed on a patient with such a condition complicated by a vesicocolonic fistula, during which time there had been little if any subsidence in the size of the inflammatory mass in the pelvis, it occurred to one of us (Pemberton) that heat, applied as in the Elliott treatment, might hasten the absorption of part or all of the tumor and render the affected portion of the intestine more amenable to surgical resection The result appeared so remarkable and immediate, at least to us, as to warrant the report of the following case

A man, 53 years of age first registered at The Mayo Clinic, August 19 1935 complaining of backache general From the Division of Surgery The Mayo Clinic malase, and pyuna. In May, 1934, he bad had a severe sore throat with chills, fever, and marked cervical ade nopathy. One week later, severe pain had developed over the symphysis and mild daysura had been noted. Examina tion of the urine had revealed pus. There had not been any associated pain in the flamks. Since this attack the patient had not been well but it had been difficult to elicit any specific compliant. No dysuri or pain had been present the patient had noted only a slight discomfort in the right lumbar region after he had been on his feet for some time. He had lost 20 pounds (q kilograms). There had been no bermaturia colie, or passage of grave. About 1 month prior to his admission to the clime be had noticed the passage of gas from the uether as the end of muctur tion but this phenomenon had disappeared, and at the time he came to the clime, he had no urinn; symptoms except the pyuria, discovered by his physician.

The family and mantal histories were without significance. Alcohol was used shightly and tobacco moderately. The previous illnesses had been limited to typhoid fever and tonsilities. Varicose vens had been treated by injection at intervals during the 3 years before he came to the climic. He had been subject to slight constituation which had required a cathartic about once a week. There had been no unrany disturbance prior to the one already men.

tioned, except occasional noctuna

Physical examination revealed a well developed and well nourshed man who did not appear acutely ill. His height was 70% inches (179 centimeters). His normal weight had been 200 pounds (99 7 kilograms) and his weight at the time of his examination at the clinic was 197 pounds (80 o kilograms). The values for the blood pressure, expressed in millimeters of mercury were 128 for the 53 kilograms) and the disablot. The pulse rate was 74 beats per minute and the tompeture was 96 degrees. The skin of the contraction of the first pound of the first pulse rate was 75 to 18 first pulse and the foundation. The teeth were in fair condition and the tomals were atrophic and scarred. The abdomen was protuberant and tympanite, no masses or tenderness and no hernia were discernible. Testes were normal. Digital examination of the rectum revealed a normal prostate gland, but a moderately tender, firm mass just above it. The reflexes were normal. A few varicostites were present on both legs

Fxammaton of the urine did not reveal any abnormality except for pus graded to no a basis of 4, that is about 6 cells to a low power field. There was no growth from a culture on Endo's medium. The floculation test for syphilis was negative. The value for the hemoglobin was r4 r grams per 100 cubic centimeters of blood. There were 4500,000 ery throeytes and 12 400 leucocytes per cubic millimeter of blood. The value for the blood urea was 26 milligrams per 100 cubic centimeters. A roentgenogram of the thorax was normal except for slight torsion of the aorta. A roentgenogram of the kindneys, ureters, and bladder revealed a rounded shadow just off the tist lumbar vertebra and a rounded shadow just off the city lumbar vertebra and as closed an obstructing lesion of the sigmoid flexure and perforation, believed to be the result of dietertucilities.

After cystoscopy and examination of an intravenous urogram the following urologic diagnosis was made. "In the dome of the bladder there is an opening z by i cent meter in diameter which is appearently of long standing as there is no evidence of any inflammatory reaction about it foculent material and a hubble of air pass lack and forth into this on pressure. Previously it mas probably connected with the bowed but now is apparently closed off. There with the contraction of the protestiar united ducts and marked deformity of the protestiar unether and the bladder.

The proctoscopic examination did not reveal any abnormality except an anal fi sure. The bowel was examined for a distance of 22 centimeters above the anus.

The clinical diagnosis was diverticulities of the sigmoid figure and obstruction and perforation into the bladder. The patient was advised to submit to exploration to rule out malignancy and because of the possibility that the

mass might be resected

Accordingly on August 20 1935 by using a combination of spinal and general anestical exploration was under taken. The approach was by means of a left rectus incusion. A tumor the size of a doubled fist was found not working the midportion of the signoid flerure and its measurery. Part of this mass estended over the dome of the bladder. It seemed definitely to be a diverticulitie. An attempt was made to use the descending colon for a colostomy in the son seas the midline and had practically no mesentery, Accordingly another small must on as as made in the mid line in the epigantium and a loop of transverse colon was brought out as a transverse colortomy.

The colon was opened on the third postoperative day and except for a very mild bronchopneumonia on the right side the patient a convalescence was uneventful. He was di missed September 19 1935 and advised to return in 3 months for examination and possible resection of the mass

On January 2 1036 the patient returned He had gained about 10 pounds (4 x lidorgrams) since his dismissal. There had been no unrany symptoms and no gas had been passed through the unchra. The results and the second been little if any decrease in the state of the hard fixed been little if any decrease in the state of the hard fixed had been no subsidence of the mass it was thought that hast applied in the form of the Elliotic treatments per unfainmatory mass and thus render the modived institution of the state of the state of the state of the state of the unfairmatory mass and thus render the modived institution.

Accordingly on January 4 1036 a rectal application was inserted high on the anternor surface of the sigmoid fierure and treatments started with a pressure of 137 pounds and at a temperature of 177 eigenes. The treat ment was continued for no munites. In the concrete of 179 degrees F. The treatment was continued for no munites in the concrete of 179 degrees F. The pressure was increased to 3 pounds and the duration of the treatment was increased to 1 hour These factors were maintained for five treatments in all there were 13 treatments. The intervals between the treat ments averaged one day. Examination after the eighbar application for completion of the heat therapy the tumor was about two-thirds is no engulater.

The patient was each home and advised to return in about a weeks for exploration and resection of the mobiled intestine or dramage of the abscess if necessary. On his return the tumor had diminished appreciably in size and under spinal and general anesthesia exploration was per formed on February 10, 1036 through the old left rectus mussion. The mass was easied by directiculties of the upper portion of the sigmood flexure a loop of which had dropped down and was addrenent to the superior and posterior surface of the bladder. This addression was readily separated by finger of section and the inflammatory mass which was less than half its original size was or the surface of the surface of

Clamps were applied to the spurs on April 23 1936, May 11 and May 21. The stoma in the sigmoid flexure was closed June 1 1936 and that in the transverse colon on June 11 1936. The patients was dismissed from the hospital on June 20 and went home with both wounds healed.

Sydney Jones, in 1859, first recognized and reported accurately the postmortem findings in a case in which coloresical fistula resulted from directicultis. His consideration of the pathogenesis of the lesion could not be improved on today. "Probably freal matter had lodged at the bottom of one of the false diverticula and had produced ulceration, owing to which an abscess was formed external to the bowel, which had eventually communicated with the bladder."

According to W. J. Mayo diverticulosis was present in 5.7 per cent of a series of 31,838 cases in which roentgenological examination was performed at the clinic Active diverticulitis was present in 606 cases Most of the patients who revealed roentgenological evidence of divertic ulitis were more than 40 years of age and 64 per cent of them were males. This incidence of diverticulosis is about the same as that found at necropsy on patients who belonged to the same age group, by Robertson of the chine. In a study of 130 cases of diverticultis H C Edwards determined that there were fistulas between the colon and bladder in 3 cases Adding to these 3 cases, 16 more instances of colovesical fistula obtained from his colleagues, he observed that this complication was five times more prevalent among men than among women and that the ages of the patients ranged from 44 to 60 years, the average being 54 years H Lett found colovesical fistula present in 7 of 172 cases of diverticulitis He determined that this complication was seen once in 10 000 admissions to the hospital, it is undoubtedly rare and more often is a sequel of diverticulitis than of carcinoma. He believed that the position of the uterus between bladder and sigmoid explained the comparative rarity with which these fistulas are found among women

The patient who has a colovesical fistula usually gives a history of long standing constipation with episodes of abdominal pain which frequently are accompanied by fever Edwards found the abdominal symptoms to precede the appearance of the fistula by 3 years and 9 months on the average The symptoms referable to the fistula itself often occur suddenly during an attack of abdominal pain which subsides with the appearance of cloudy and bloody urine accompanied by gas or feces, or both, from the urethra amount of gas and feces noticed on micturation varies considerably Dysuria, urinary frequency and nocturia are usually complained of because

of the cystitis which almost invariably is present The diagnosis is based on the history of episodes of abdominal pain simulating diverticulitis, the passage of gas or feces, or both, from the urethra, and the cystoscopic indings H Lett has well described the various cystoscopic pictures seen in cases of colovesical fistula and classified them in three groups, depending on the stage of the disease. In the first group he included the cases of early involvement with general acute cystitis and a circumscribed red edematous area usually found on the left of the bladder fundus and upper portion of the posterior wall of the bladder. The edema of the mucous membrane of the bladder may be so marked as to throw it into folds and papillomatous projections. The second group includes the fistulas of long standing in which the opening is small so that there is very little cystitis or edema and the small ulcerated region is the only finding. The third group is that in which the fistula has closed and a traction diver ticulum has been produced. This is usually obvious and the position is characteristic. There may be slight congestion of the mucous membrane

The actual demonstration of the fistula by means of the roentgenoscope and barium enema is difficult but should be possible if the opening is of sufficient size However, in the bands of the expert, a diagnosis of diverticulitis which will explain the findings in the bladder usually is possible by this means. It rarely is possible to find the opening in the bowel by means of the sigmoidoscope but again the presence of diverticulitis may be ascertained and malignancy occasionally may be ruled out

In spite of the trepidation with which the surgeon attempts to remedy this condition there is fair uniformity in the procedures used by those who have had a considerable experience W J Mavo, Judd, David, Hunt, Abell, and Rankin all advocated preliminary colostomy before attempting to disconnect the vesicocolic fistula or to resect the mass if this proves necessary. After dissecting and suturing the fistulous tract, C H Mayo recommended interposing the omentum between the bladder and bowel and around the latter, which is finally sutured to the abdominal wall It is important, as advised by Lett and Edwards, that the colostomy be of such a type and so situated as completely to sidetrack the fecal stream and put at absolute rest the affected portion of the colon After this preliminary step, an interval of as long as one year has been recommended to allow the inflammation to subside before attempting repair or excision of the fistula It is during this interval that the application of heat in the form of the Elhott treatment is advocated and was found to be so efficacious in the case cited. It is our belief that this interval between colostomy and repair or excision of the fistula can safely be shortened to 3 months if the patient undergoes a thorough course of heat treatments and if there is a perceptible decrease in the size of the inflammatory mass as determined by examination If at the time of the second exploration resection is believed necessary, the Mikulicz type of exteriorization is, if applicable, the ideal procedure. The graded operation is superior because of the lower morbidity and mortality which accompanies it and because there is less danger of contamination resulting in peritonitis than when primary anastomosis of the bowel is attempted at the time of resection

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EDITORIALS

SURGERY Gynecology and Obstetrics

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AUGUST 1937

VIEWPOINTS RELATIVE TO ABDOMINAL SURGERY GYNECOLOGI, AND OBSTETRICS

TEDICAL and surgical specializa tion should not signify that the qualified specialist in any field limits his knowledge and training to regions No one realizes this better than the internist and the obstetrician. There are two types of internists - those who care for adults and those who handle children. Of course there are those, such as the neurologist, gastro enterologist and others who limit their activi ties to various systems and remons specialists cannot ignore other helds and must consider the patient as an organism in her re A medical as lationship to the environment distinguished from a surgical disorder can hardly remain localized A condition which is amenable to surgical or operative treatment must be localized though it may have an effect on the whole organism A gastric ulcer is a local process and becomes at times a surgical disorder, revertheless, it may, through digestive disturbance and bleeding, produce systemic effects

In a similar manner the gynecologist may be confronted with a fibromy oma of the uterus which bleeds and produces a marked second art anemia which can be corrected by removal of the eventing cause. Both the surgicion and the gynecologist are lable to focus attention upon the local condition which they are called upon to treat by mechanical methods. New there of these specialists deals with ply sological processes but with pathological conditions. This does not imply that they are necessarily unfamiliar with ply sology, which is an essential part of their intellectual equipment, but it does mean that their daily routine is concerned with abnormal processes.

The obstetrician, on the other hand, con stantly is confronted with the physiology of pregnancy, of labor, of the puerperium, and of lactation. The pathological state associated with these processes is present in only a minority of his patients. He therefore has a different viewpoint with reference to his patient who is a woman passing through a physiological process which affects the physiology of all her organs and any one of which may be subject to some disease process at any time.

The surgeon the gynecologist and the obstetrictan all should have a common view point with reference to surgical technique. Thei should all know how to maintain asepus, control hemorrhage, prevent shock, minimize training and repair injuries. No one can or should practice in any one of these fields with out such fundamental knowledge upon which to huld the practice of his art. No one should

practice abdominal surgery who does not understand the physiology, pathology, and treatment of diseases of the gastro intestinal tract No one should practice gynecology who does not have an adequate, corresponding knowledge of the female generative organs No physician should practice obstetrics who does not possess the special knowledge of the normal and abnormal processes associated with reproduction. It is equally true that the abdominal surgeon should know the pelvic structures and that the pelvic surgeon should have knowledge at least of the lower abdominal viscera The obstetrician and gynecologist must be familiar with the vaginal route, which knowledge is not so essential for the abdominal surgeon

The non-pregnant woman cannot be separated sharply into regions for division among specialties. The pregnant woman presents special problems of both general and local character during pregnancy and especially when in labor The remote consequences of parturition lead one into the field of gynecology almost constantly, but seldom into abdominal surgery above the pelvic level Disease of the generative organs frequently affects the reproductive function in some of its activities These fields of specialization are closely related technically and practically, and from the standpoint of teaching The capacity of doctors for knowledge and activity varies enormously. One man may be a better abdominal surgeon, gynecologist, and obstetrician, than another is an obstetrician, but as a rule a man works best in the field of his greatest interest, and it is difficult to be equally interested in and informed about all fields The specialist should maintain his interest in the patient rather than in regions, he should recognize his proficiencies and his deficiencies and be guided by the best interests of the patient rather than by his own

So far as the named specialties are concerned nothing could be more conducive to the welfare of women than close co operation in actual practice among those who are skilled in their respective activities There should be mutual recognition of the rights of patients and the abilities of other specialists. The surgeon or gynecologist or other specialist who delivers a few women annually by cesarean section is probably not equipped to pass judgment upon the desirable procedure for a woman whom he sees in consultation with a general practitioner any more than an obstetrician would be able to decide upon the preferable procedure in an obscure upper abdominal disease requiring surgical intervention

A specialist and practitioner, recognizing his own limitations and the abilities of others, should be guided by the best interest of the patient in her treatment, seeking the advice and assistance of qualified consultants when their services can be of value to her

FRED L ADAIR

THE RADICAL VERSUS THE MORE CONSERVATIVE ATTI-TUDE IN THE TREATMENT OF BRAIN TUMORS

N the surgical treatment of disease, the attitude of the profession has fluctuated constantly between the conservative and the extremely radical Several factors are responsible for this, and the treatment of many surgical conditions has been affected Discouraging results have made some radicals conservative, and some conservatives, realizing that they are not securing good results with conservative methods, have resorted to radical methods. Appendicitis, tuberculous glands of the neck, carcinoma of the stomach, gastric and duodenal ulcer, and trigeminal neuralgia

are a few of the conditions in which great changes in treatment have been made within a few years

One factor that has brought about such changes is the fact that the study of senes of cases in which certain methods have been used has shown that the results do not justify the continuance of these methods. A second factor is that the mortality percentage following cer tain radical procedures may be so great that the surgeon hesitates to continue to use the method While this may delay progress for vears, still some surgeons, even while depressed by poor results, have been so certain they were right that they have persisted and have ultimately triumphed Billroth, for instance, in 1578 wrote to his former pupil Czerny that of a patients upon whom ovariotomies had been performed, 2 had died. He steadfastly continued, however, and a few years later was able to report the good results with which we are all familiar today

The radical treatment of trigerninal neural Lia, which Hartley and Krause recommended and which gave permanent cure, at first was greeted with great enthusiasm. This enthusi asm rapidly waned however, because of the prohibitive mortality in the bands of the general surgeon. Twenty years ago the mortality rate given in Keene's Surgery was well over to per cent. But the patients suffering from the douloureux clamored for permanent relief, and it was through the persistent efforts of Cushing, Frazier, and others, that the oper ation of section of the posterior root of the gasserian ganghon was put on a new plane What at first had been a most formidable un dertaking has now become a safe procedure, and the mortality rate is extremely low, less than I per cent

At the present time, the neurological sur geon is facing a similar difficulty in another field—that of the surgical treatment of tumors of the brain How shall such tumors be treated? Before the days of ventriculography, when comparatively few tumors were exposed at operation, the question did not arise. But today, when over 97 per cent of all tumors are exposed at operation the proper procedure is a problem which each surgeon must face

Operations to remove tumors of the brain are operations of necessity, not of election the only way at present to rid a patient of a brain tumor is to remove it, either by surgical excision or possibly by destroying it with radiation by means of radium or deep rocaligan ran therapy.

In dealing with hrain tumors a number of questions arise that need not be considered in tumors elsewhere in the body. The removal of a brain tumor, even a benign one such as a meningioma, may leave a patient with a per manent disability. After removal of a tumor of the occupital lohe, the patient may be left with an homonymous bemianopsia. When a tumor involving the precentral gyrus is re moved, the patient may have a permanent hemiplegia or certainly a hemiparesis disabilities do not follow removal of tumors in other parts of the body. The possibility that such disabilities may occur is an added factor that must be weighed before a decision is reached to remove a brain tumor. It should be kept in mind too that such disabilities may occur prespective of the type of tumor-they may follow removal of a benign meningioma or of either a malignant or benign glioma

Ghomas may be divided into three general groups

I The well demarcated tumor, even though not encapsulated In this group belong the astrocy tomas, the ependymomas, ind the oli godendrogliomas, the three types of slowly growing gliomas which, I think, we have a right to look upon as benign tumors. Some of these tumors may be partially calcified

- 2 The radiosensitive tumors—the medulloblastomas
- 3 The spongioblastic type These tumors show a great tendency to recur and must be considered malignant

There is no disagreement today ahout the treatment of a benign tumor, even if we know its removal will leave the patient with some disability, such as has been mentioned. In the past few years, however, a curious tendency has developed in regard to the treatment of the spongioblastic tumors—now spoken of as globilastomas—and the radio-active tumors—the medulloblastomas.

It is a fact well recognized by the neurological surgeon that the exposure of a tumor at operation without removing it, only a decompression being done, greatly increases the immediate mortality of operation Consequently, when a tumor, even a glioblastoma, is exposed at operation as complete removal as possible should he undertaken to afford the patient temporary relief The surgeon who helieves in the radical procedure will leave a decompression as a safety valve, and then if the tumor recurs he may make another attempt to relieve the patient and try again to eradicate the disease The conservative surgeon, bowever, has claimed that no glioblastoma can be cured and therefore that only one operation should he undertaken, that it is better not to do a decompression so that when the tumor recurs the patient will die promptly, thus spar ing him a long period of disability and the family much anguish and expense suggest that a certain group of tumors, the medulloblastomas which are radiosensitive, should not be operated upon at all, and without histological confirmation should be treated with deep roentgen-ray therapy, which is acknowledged to be only a palliative procedure

I cannot subscribe to these points of view, for to do so would be to assume that we have

gone as far as we can in the surgical treatment of these conditions, it is an acknowledgment of defeat. To my mind, it is an extension of the euthanasia idea which, though it may be justified in conditions that are definitely hopeless, has no place in any condition in which there are possibilities, even though remote, of curing the patient. Surgical progress would have ceased long ago bad this defeatist attitude heen followed.

It was my privilege 30 years ago to hear Victor Horsley express himself on this subject. He was asked to see a patient with a pituitary tumor. Up to that time he had operated in very few such cases and had never cured one. He announced that he would operate upon the patient. His colleague remarked, "But the patient will die." His answer was, "Yes, probably, hut if I don't undertake it, those who will come after me will not learn to do these cases successfully." This, I take it, is the attitude of the pioneer and the conqueror who is never willing to accept defeat, hut keeps on striving for greater things.

Until some new method of treatment is devised, patients with brain tumors can be cured only by having the tumor removed surgically. A few cases of ghoblastoma have had no recurrence and are living years later, some patients who had medulloblastomas removed are living and well at the end of 7 to 8 years. The ultimate result in eighth nerve tumors, acoustic neuromas, is better if the tumor is radically removed, even though at present the immediate mortality is greater than when it is incompletely removed hy the intracapsular method. This simply means that we must perfect our technique as Billroth perfected his through thal and error to final success.

Progress seems to demand that the radical removal of tumors of the brain is what we should strive for, even though it may not be possible to apply this principle in every instance If only one patient in perhaps a hundred of these cases can be or has been cured, the possibility that newer or more radical methods may accomplish more must be kept in mind Following this line of reasoning, in addition to radical extirpations, we have in the past year been giving very large doses of x ray directly into the operative wound

Those who are doing surgical work which is in the nature of pioneer work must carefully weigh the sociological and economic needs against the medical needs. Like Victor Hors ley they must weigh the present day results with the good to be derived by future generations. But if they allow the economic and social needs of the patient to influence them too greatly, the desire to press on along a path which at first may not yield results may be set aside. The pioneer spirit, the all consuming wish to make advances and improve results, has characterized the thoughtful, progressive surgeon at all times.

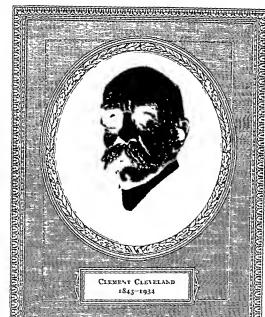
ERNEST SACHS

WORKS OF ART IN MEDICINE AND SURGERY

Thas been suggested by Alexander Wooilcott that the Mellon art treasures should not be housed in a formidable museum in Washington where only a few of the fortunate people able to travel can see and enjoy them, but that the pictures be sent on tour, so to speal. It would be his idea to arrange for these valuable and beautiful works of art to he on view in the various cities of the United States in turn. By so doing it would be possible for the largest number of people to see and enjoy them. In other words, Woollcott would not entomb them in a pretentious mau soleum of art in Washington whence one must travel to enjoy them.

The editors of Surgery, Gynecology and Obstetrics have realized that the fine en gravings of the portraits of historical figures in medicine are not available even in one museum to all of the doctors who are interested and would enjoy seeing them. It seemed practical and worth while to reproduce those masterpieces in this journal from time to time in such a manner that they might be kept and preserved permanently by our readers

In January, the original engraving by W Holl of Ambroise Para was reproduced In April, the classic painting by E. Hamman of Andreas Vesalius was reproduced from the original lithograph by A Mouilleron In this issue, the portrait of John Hunter is reproduced from an engraving by William Sharp of the painting by Sir Joshua Reynolds All are famous among medical bibliophiles and the collectors of art relating to medicine. We trust that our readers will be interested in preserving these reproductions as represent ing a part of the cultural side of surgery There are many other artistic and historical masterpieces which the Editors hope to make available from time to time



MASTER SURGEONS OF AMERICA

CLEMENT CLEVELAND

N April 16, 1934, Dr Clement Cleveland died at his winter home in Florida, having just entered his ninety-first year. Few men have been so vitally active for so long a time, so mentally alcit, so interested in lite, as he. When the writer of this brief sketch first knew him, forty-three years ago, he looked the athlete that he was—ready for any encounter. Since then, an intimate and uninterrupted association with him showed a mental alertness and development which far outstripped his physical powers. His interest in the practice of his profession was intense, and there was no sacrifice of time or money too great for him to make. His sympathy for rich or poor was unbounded, and its practical application was never wanting. His geniality won him devoted and constant friends and his spirit in the sick room brought comfort, even when hope of life was lost. His personal characteristics were striking and his many scientific attainments of high order.

Dr Cleveland was born in Baltimore, Maryland, on September 20, 1843, of an old English and New England ancestry He graduated from Harvard in 1867 with the degree of Bachelor of Arts. He continued his studies at Harvard for his Master's degree and at the College of Physicians and Surgeons for his Medical degree, obtaining the former in 1870 and the latter in 1871. His active medical career began as an interne at the New York City Hospital, from which he received his diploma in 1871. He then became an interne at the Woman's Hospital in the State of New York, receiving his diploma in 1872 From 1874 to 1877, he served the City Hospital as attending surgeon, and from 1882 to 1015 he served as attending surgeon to the Woman's Hospital, followed by 3 years as surgical director His services were continued in this institution as consulting and emeritus surgeon until his death. He was one of the founders of the Memorial Hospital. known then as the Cancer Hospital, where he served as surgeon for 3 years and as consulting surgeon until his death. It was at this institution that he first became interested in the study of malignant diseases peculiar to women-an interest which led him, with others, to organize the Society for the Control of Cancer

Dr Cleveland's scholastic education was at an institution which offered every opportunity to a student that could then be had in this country. He came in contact and was greatly influenced by such men as Wolcott Gibbs, Charles W. Eliot, Andrew Preston Peabody, Oliver Wendell Holmes, and in New York,

where he took his medical degree and early training by Drs Francis, Barker, Sims, Thomas, Peasley, and others of great fame. His medical classmates and companions, Kinicutt, Bull, and Bererk Robinson, who became as he did, outstanding in their special fields remained his devoted friends throughout their lives.

His apprenticeship at the Woman's Hospital was during the pioneer days of gynecology. There he had the opportunity of seeing the work and of working with the foremost men of that day in this special field. Sixts-three and 24 years before, Ephraum McDowell and Marion Suns, respectivels, had blazed the way in major abdominal and plastic surgery. But the full results of their knowledge and skill in allaying the fears of suffering and afflicted women were not realized until the coming of anesthesia and antisepsis. Thomas A Emmett, Gaillard Thomas, and Edmund R. Peasler followed, adding their surgical techniques and dextenty as princeless contributions to the advancement of genecology.

It was in this atmosphere charged with attainments, disappointments, and great hopes—on the very threshold of Lister's great work—that Clement Cleveland was privileged to begin his active surgical career. And of those who started with him, few if any, outstripped him in the race.

Interested in everything pertaining to life and its preservation, and backed by a laudable ambition to vie with bis colleagues in service to bumanity, he fought his way in his cho-en field to an honorable fame. To evaluate him, we must consider his work from the standpoint of scientific mechanics and from the standpoint of art or individual deriently, for the time in which he was most active was that of the development of the mechanics of surger. He became acquainted with bacteriology and pathology chiefly in a practical way, and applied intelligently the knowledge be acquired. His original work in the field of mechanical inventions was recognized in his day, as, for example, his self-retaining speculum, his ligature carrier and adjustable laparotomy table, for which he was avarded a gold medal by the French Government in appreciation of its value in securing the Trendelenburg position. As time passed on, these with other inventions were superseded, but they served as stepping stones in the great advance of surgery.

By the recognition of his valuable literary contributions to surgery, by the recognition of his in entive genus in the mechanics of surgery, by the recognition of the many improvements in surgical technique and for the art in which he executed his work, he was honored many times and in many ways. Among the most conspicuous honors be received, were the presidencies of the New York Obstet rical Society and of the American Gynecological Society, the vice presidency of the Society for the Control of Cancer, a governorship in the American College of Surgeons and appointments of high trust in noted hospitals in the City of New York.

Dr Cleveland's social life was that of one surrounded by devoted friends His acquaintance was extensive and his affiliations with social clubs, notable He was one of the founders of the Harvard Club of New York City, one of the early members of the University Club, and a member of the Century Club From these sources he drew many of his early friendships But as time moved on, Death reaped his harvests, leaving him a lone sentinel until he too fell

DOUGAL BISSELL

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Facsimile of Surgeon General's order for supplies for a wounded prisoner dated February 27, 1787 and signed by Wilham Eustis later Secretary of War in President Madison's cabinet

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

▼N Bright's Disease and Arterial Hypertension—a well bound and well printed volume of 352 pages—the author has tried to correlate and clarify "the various opinions experienced in the enormous literature on the subject "Dr Stone has been keeping notes on the course and progress of patients with Bright's disease for 20 years and he presents the autopsy reports on 140 cases after a general review and discussion of the literature The author com ments that one of the main reasons why divisions of renal disease into "parenchy matous" and 'interstitial" groups "endured so much longer than the terminology merited was hecause of its simplicity In the study of patients with Bright's disease, physicians are in many cases ignorant of the etio logical sequences but are relatively secure in their conceptions hased upon long observation of the clinical course of the disease" The author then groups the problem into (1) Acute Bright's disease hemorrhagic and degenerative (2) Chronic Bright's disease—arteriosclerotic with primary by -hemorrhagic and degenerative pertension, hemorrhagic with secondary hyperten sion, and degenerative without hypertension The reviews of the physiology of kidney function, water halance, edema, acidosis, and uremia are especially well done The hest of the late work has been drawn upon in an attempt to develop the subject

The second half of the book lacks some of the force of the first half and Dr Stone's discussion hrings out great gaps in our understanding of Bright's disease, the reader is impressed with the great need of further work even though great prog ress has been made in the past 10 years. This volume should he of definite help to the majority of physi cians who treat Bright's disease

M HERBERT BARKER

NASMUCH as the last edition of Keyes' Urology appeared in 1928, many improvements have occurred in the diagnosis and treatment of genito urinary disease The new edition2 has been entirely rewritten to embrace the changed concepts of the character of disease, modern diagnosis and therapy, namely intravenous urography, prostatic resection, calculogenesis, tuberculosis, tumors, and irradiation therapy The number of illustrations has been doubled The book largely represents the semor author's experience, while the comments on

Stone B Sc M D F A.C.P Philadelphia and London W B Saunders Stone BSC M.D. F.A.C. (SILEMANN)
CO. 1036

*Unional S. B. Edward L. Keyes Ph.D. F.A.C.S. F.R.C.S. (Honbags), and Russell S. Ferguson A.B. vi.D. 6th ed. New York and
Lendon D. Appleton-Century Co. 1036

pathology, irradiology, endocrinology, and tumors are almost exclusively the junior author's

On controversial topics, the student is referred to the discussions of various international and national

The table of contents has been amplified and rearranged from its original 21/2 pages to 111/2 pages This is a much needed improvement. The index of necessity has been enlarged, and the many new words and expressions indicate the number of changes in urology in a scant 10 years

The term "achalasia" has almost completely re placed the word "sclerosis" in reference to the vesical neck Avitaminosis, hyperparathyroidism, prolan A and the rôle of other endocrine substances are new subjects in this volume "Atony of the bladder." neglected for some time, is again included

Formerly it was stated categorically that the urinary tract was entirely aseptic now-emphatically no It is eminently infectable. The introduction of less harmful contrast media in pyelography has removed the former dangers of hilateral simultaneous pyelograms The cystometer is believed a misleading weapon except in expert hands

Heat therapy in the treatment of gonorrhea is fully discussed "Fever therapy, though hy no means always successful, is specific and requires no supporting systemic or local treatment of the gonorrhea" The conclusions are "In the present state of our knowledge, heat therapy is too uncertain in its results as well as too prostrating, too dangerous, too expensive for use in any hut the most unusual cir

The progress in our knowledge of the pathological physiology and diagnosis of tumors of the testicle is excellent

In discussing transurethral prostatic resection, the hand of the senior author can he plainly seen He discusses with his usual candor and bumor the status of this popular controversial procedure. In effect, it is an operation which the average urologist will never do well Naturally, in such a texthook, the beginner should be properly advised Transurethral resection should he done only hy the expert The authors favor the two stage suprapulic operation and for small prostates, resection by the hest method learned at a successful clinic The application of resection for carcinoma of the prostate is mentioned but not stressed

The reviewer and his colleagues have used keyes' Urology as a standard textbook in teaching medical students for many years We find the new edition by Keyes and Ferguson vastly superior in every

Patesfuld Feb 17 181. In Alust to alway the have one gallon run, two founds candles of four founds of frown frear for a wounded prisoner M. Eufler Turger Man Ruggles or Ruen I an Rusmet the Wether One Two pours fantles Zebeach fish Can'

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

EUGENE H POOL, New York, President FREDERIC A BESLEY, Waukegun, President-Elect VERNON C DAVID, Chairman, Michael L Mason, Secretary, Committee on Arrangements

PRELIMINARY PROGRAM FOR THE 1937 CLINICAL CONGRESS IN CHICAGO

THE surgeons of Chicago, under the leadership of a representative committee, will provide a program of chines and demonstrations for the twenty-seventh annual Chinical Congress of the American College of Surgeons in Chicago, October 25-29, that will present a complete showing of the clinical activities in all departments of surgery in this great medical center.

A preliminary schedule of the operative clinics and demonstrations, as prepared by the committee, appears in the following pages. Published in tentative form at this time the clinical program will be revised and amplified during the months preceding the Congress. It will be noted that clinics are being arranged for the afternoon of Monday, October 25, and for the mornings and afternoons of each of the four following days.

In addition to an ample and well arranged schedule of operative clinics that will demonstrate the technique of a wide variety of surgical procedures, the committee is arranging a series of demonstration clinics at the medical schools and in the larger hospitals to present the work being done in many special fields, including neurosurgery, traumatic surgery, thoracic surgery, plastic surgery fractures, cancer, orthopedics, gynecology and obsetters, genito-turnary surgery, experimental urgery, physical therapy, roentgenology, etc.

The committee is assured of the hearty co-operation of the clinicians at the five medical schools and more than fifty hospitals that will participate in the clinical program

So that the visiting surgeon may be assured of an opportunity to devote his time continuously, if he wishes, to chinics dealing particularly with those special subjects in which he is most interested, the committee has undertaken to correlate the programs of the participating institutions planning to arrange so that fracture climics or

cancer clinics, for example, will be available each morning and afternoon during the five days of the Congress

An extensive schedule of operative clinics and demonstrations at the bospitals and schools is being prepared by the subcommittee on ophthalmology and otolary ngology. In addition programs are being prepared for two evening sessions at the Stevens Hotel 1t which visiting ophthalmologists and otolary ngologists will present and discuss papers of interest to those who specialize in these particular fields.

As they so faithfully depict clinical features of major interest to surgeons, the showing of surgical motion picture films will be continued at this year's session with an enlarged program of both sound and silent pictures to be exhibited daily at headquarters

EVENING SCIENTIFIC MEETINGS

Programs for a series of evening sessions are being prepared by the Executive Committee of the Board of Regents A preliminary outline of these programs will be found on a following page

At the opening session, the presidential meeting and the convocation, in the ballroom of the Stevens Hotel on Monday evening, the address of welcome will be given by Dr Vernon C David, chairman of the committee on arrangements, following which a number of distinguished foreign guests will be introduced

Dr Eugene H Pool, of New York, retiring president, will deliver the presidential address, followed by the manguration of the new officers—Dr Frederic A Besley, of Waukegan, president, Dr Frank W Lynch, of San Francisco, and Dr Austin B Schinbein, of Vancouver, vice-presidents At this session the 1937 class of initiates will be received into [fellowship in the College The annual college oration on surgery will be

delivered by J P Lockhart Mummery, MB, BCh, FRCS, of London, England.
At sessions on Tuesday, Wednesday and Thurs-

An exemps, addresses on surgical subjects of special importance will be presented by outstanding surgeons of the United States and Canada. A preliminary outline of these programs will be found on a succeeding page

AFTERNOON SESSIONS

A cancer symposium on Tuesday afternoon, under the auspices of the Committee on the Treat ment of Vallegiant Diseases will deal not so much with organization and administrative problems as with scientific and clinical phases of the cancer problem. Figures on five year cures of cancer problem. Figures on five year cures of cancer problem. Figures on five year cures of cancer period of the problem of the problem of the problem of the problem. See a pathologists and radiologists as individuals or as members of hospitals and clinics, will be presented at this conference. These, added to the 24,440 five year cures reported by the College in 1034 should provide a basis for increasing bope fulness of cancer control on the part of the public as well as of the surreon.

The conference on graduate training for sur gery to be held at 200 o clock on Wednesday the program for which appears on a succeeding page, will be of interest to all Fellows of the College since it is one related to the requirements for fellowship. A need for consideration of the various aspects of this subject, to be participated in by prominent surgeons and representatives of other interested organizations, bas long been felt The field staff of the College has for six years been collecting and recording information on the opportunities for graduate training provided in bospi tals particularly the larger ones, and this data together with findings from a 1937 survey of hospitals made by a special field representative will be reported. In a panel discussion there will be presented the viewpoints of the surgeons in the teach ing hospital the large non teaching hospital and the rural community hospital on graduate train 122 The findings and viewpoints of the American Medical Association, the American Surgical Association, the American Board of Surgery and others will be presented and discussed with a view to correlating all available information and expen ence on the subject of the opportunities now open and those which should be provided for the graduate student

A symposium on obstetries and gynecology is also scheduled for Wednesday afternoon. Papers of interest to the general surgeon as well as to the specialist in these fields will be presented by well Inown authorities Significant of what some surgeons today believe is a noticeable trend is the subject of the first paper, "Conservatism in Obstetings"

Thursday aftermoon will be dee toted to a con ference on industrial medicine and traumatic surgery. Subjects discussed will be of special interest to surgeons who are in the field of industrial medical service, but also come within the scope of general surgery since the injuries suffered by the workman are often the same as or similar to those experienced by the authority of the control of the

whose auspices this sympo, num will be held. Surgeous in industry as well as those in general practice will be interested in the Friday alternoon program to be presented by the Committee on Fractures. Newly des eloped methods of dealing with fractures and their results, will be described by surgeous who have had wide experience with this type of injury.

Further exposition of the various phases and subjects of industrial medicine and fractures will be given in climics and in demonstrations in various Chicago hospitals during the Congress. The scientific exhibits at headquarters will also include many items appertaining to these subjects.

HOSPITAL CONFERENCE

The twentieth annual bospital standarduzation conference of the College (see program in the following pages) will consist of morning and alter noon sessions from Monday at 1000 a.m., to Wednesday noon at the Stevens Hotel including a joint session with the Charago Hospital Association and the Christop Hospital Council on Tuesday evening, demonstrations in various Cherago hospitals on Wednesday afternoon, sessions Thursday morning and afternoon at the headquarters hotel, and imspection trips to Chicago hospitals on Friday.

Dr. Eugene H. Pool of New York, president of College will address the opening ession. Dr. George Crile, of Cleveland chairman of the Board of Regents, will prevent the report of the 193 survey of hospitals and the official announcement of the approved list. There will also be presented at this session addresses dealing with the obligations of the hospital consideration of personality.

and psychology factors, selection of hospital personnel, and effects of hospital insurance plans

"The Medical Staff Conference" will furnish
the general theme for the Monday afternoon sesson Following a discussion of the subject in its
various aspects the medical staff of the Ravens
wood Hospital of Chicago will stage a demonstration of a model conference

Addresses at the Tuesday morning session will be on the general theme of the clinical departments of the hospital, and at the afternoon session on the management of hospital personnel

"Pubbc Relations" will be the general theme of the Tuesday evening joint session, at which Charles H Schweppe, president of the Chicrgo Hospital Council, will preside The subject will be discussed from the viewpoints of the press, the hospital administrator, the hospital trustee, and the member of the medical staff Methods of raising funds will be considered The importance of winning and keeping community good will will be stressed.

The Association of Record Librarians of North America will meet in joint session with the conference on Wednesday morning Following a discussion of methods of record keeping and the value of complete medical records, a skctch, "The Medical Record Librarian's Dream Comes Truc," will be presented by the Medical Record Libraria ans of Chicago Through this dramatization it will be shown how an interested medical staff can facilitate and make more useful to themselves, their patients, and the public, the work of the medical record librarian

Sixteen Chicago hospitals and the University of Chicago Chinics will co-operate with the conference by providing on Wednesday afternoon demonstrations of many phases of hospital administration and operation Delegates may at the time they register make a selection of the demonstrations they wish to attend

Problems of hospital administration and standardization will be discussed in a round table conference and in addresses at the Thursday morning and afternoon sessions

Friday will be devoted to visits to hospitals in Chicago and vicinity Help in selecting these will be given delegates at headquarters for hospital registration and information

HEADQUARTERS AND TECHNICAL EXHIBITION

Headquarters for the Congress will be established at the Stevens Hotel where the grand ballroom with its large foyers and other meeting rooms on the second and third floors have been reserved for seientific sessions and conferences

The Technical Exhibition will be located in the Ethibition Hall in which will be placed the registration and climic ticket burerus and the bulletin boards on which the daily clinical program will be posted each afternoon for the following day Leading manufacturers of surgical instruments, via ray apparatus, operating room lights, hospital apparatus and supplies of all kinds, ligatures, dressings, pharmaceuticals and publishers of medical books will be represented

ADVANCE REGISTRATION

The hospitals and medical schools of Chicago afford accommodations for a large number of visiting surgeons, but to insure against overcrowding, attendance at the Congress will be definitely limited to a number that can be comfortably accommodated at the clinics, the limit of attendance being based upon the result of a survey of the amphitheaters, operating rooms, and laboratories of the hospitals and micical schools to determine their capacity for visitors. Therefore, those surgeons who wish to attend the Congress should register in advance

A registration fee of \$5 00 is required of each surgeon attending the annual Clinical Congress, such fees providing the funds with which to meet the expenses of the meeting. To each surgeon registering in advance a formal receipt for the registration fee is issued, which receipt is to be exchanged for a general admission eard upon his registration at headquarters. This card, which is non-transferable, must be presented in order to secure clinic tickets and admission to the exchange meetings.

Admittance to clinics and demonstrations will be controlled by means of special clinic tickets, the number of tickets issued for any clinic being limited to the capacity of the room in which that clinic is given. This plan provides an efficient means for the distribution of the visiting surgeons among the several clinics and insures aguinst overcrowding.

RAILWAY RATES

Surgeons living in the western and southwestern states and the western portion of the southeastern states who plan to attend the Clinical Congress in Chicago may purchase round trip tickets to Chicago may purchase round trip tickets to Chicago with a 30 day return limit on the basis of two cents per mile in each direction for transportation in Pullman ears not including the Pullman charge From certain points in the south Atlantic coast states (southeastern territory) round trip tickets with a 15-day return limit will be sold on the basis of two cents per mile in each direction

to Central Pas enger Association gateways, plus three cents per mile in each direction from such gateways to Chicago Round trip tickets at low rates will be available from points in the Pacific coast states

In the territory east of Chicago, north of the Ohio and Potomac rivers including the north Atlantic and New England states and eastern provinces of Canada the regular rate of three cents per mile in Pullmans and two cents per mile in coaches will be in effect

Complete information as to rates routes and stopover privileges may be obtained from local ticl et offices

CHICAGO ROTELS AND THEIR RATES

In addition to the headquarters hotel the Ste vons there are several first class hotels within Sterens 720 S Michigan Ave

short walking distance of headquarters providing ample hotel facilities at reasonable rates. It is suggested that reservation of hotel accommoda tions be made at an early date. The following hotels are recommended by the Committee

	or th Bath	
	Sage	Donbar
Auditorium 430 S Vinhigan Ave	\$2 50	\$1 00
Bismarck 171 W Rando'ph St	3 30	5 00
Blackstone Wich gan ive at , th St	4 00	5 00
Congress, 500 S Mindigan Ave	3 00	5 00
Drake Michigan and Lake Shore Drive	4 00	6 00
Great Northern 237 5 Dearborn St	2 20	400
Harrison 57 E Harrison 5t	+ 50	3 50
Knukerbocker 163 E Walton Pl	3 00	5 00
LaSalle to \ LaSalle St	300	4 50
Morrison 19 W Madison St	3 00	4 100
Palmer House 12 E Monroe St	3 50	5 00
Sherman 100 H Randolph St	2 50	4 00
Comene was & Michigan Ace	1 000	

PROGRAMS FOR AFTERNOON SESSIONS

CONFERENCE ON GRADUATE TRAINING FOR SURGERY

Il ednesday ≥ 00 P W

FREDERN A BESLEY M.D., Waukegan, Ill President, American College of Surgeons, presiding Opening Remarks George Critic, W.D. Cleveland Chairman Board of Regents, American College of Surgeons

Purpose of Conference MALCOLM T MAY EAGRERN M.D. Chicago Associate Director American College

of Surgeons

Graduate Training for Surgery ALTON OCHSNER, M.D., New Orleans

Findings from the 19.7 Sun et of Hospitals by the American College of Surgrons Melville H Manon, MD Minneapolis Special Field Representative

Panel Discussion from the following viewpoints

The Surgoun in the Teaching Hospital Dullas B PHEMISTER, VID, Chicago

The Surgram in the Large Non Teaching Hospital Donald Guidene, M.D. Savre Pa.

The Surgeon in the Rural Community Hospital. Howard L Sysper M.D., Winfeld Kan The American Surgical Association ELGENE H POOL, M.D., New York

The American Board of Surgery Evarts A Graham, M.D. St. Louis The American Medical Association Fred W. Ranken, M.D. Lexington, K.J.

Essentials in Graduate Training for Surgery Louis B Wilson, M.D., Rochester Minn

Discussion Otolaryngology Perra G Goldshith M.D. Toronto Urology Frank Hivara M.D. San Francisco Gynecology and Ob tetrics, ARTHUR H CURITS VI D , Chicago

OBSTETRICAL AND GYNECOLOGICAL CONFERENCE

Il ednesday, 2 oo P M

FRANK W LANCH M.D. San Francisco, Vice President, American College of Surgeons, presiding Conservatism in Obstetrics George W. Kosmus, M.D., New York.
Water Balance in Relation to Toxemus of Pregnancy. M. Edward Davis, M.D. Chicago

Pelvic Pain -Its Significance and Treatment. ARTHUF H CORMS, M.D. Chicago

Cesarean Section John R Fraser, M.D., Montreal.

Syphilis in the Pregnant Woman James R McCord, M.D., Atlanta.

PROGRAMS FOR EVENING MEETINGS

Presidential Meeting and Convocation-Monday, 8 oo P M -Ballroom, Stevens Hotel

Address of Welcome Vernon C David, M D, Chicago, Churman, Committee on Arrangements

Introduction of Foreign Guests

Address of the Retiring President Eugene H Pool, M D, New York

Inauguration of Officers

Conferring of Fellowships Frederic A Besley, M.D., Waukegan, Illinois

Conferring of Honorary Fellowships The President

Annual Oration on Surgery The Surgeon as a Biologist J P LOCKHART-MUMMERY, M B , B Ch , FRCS, London

Tuesday, Wednesday and Thursday, 8 oo P M -Ballroom, Stevens Hotel

Nucleus Pulposus and Lower Back and Sciatic Pains Howard C Naffziger, M D, San Francisco Symposium on Lymphedema

The Genesis and Consequences of Lymphedema Cecil K Drinker, M D . Boston

Circulatory and Lymphatic Disturbances in the Abdomen Willis D GATCH, M D, Indianapolis Diverticula of the Intestine CLAUDE F DIXON, M D, Rochester, Minnesota

Immediate or Delayed Treatment of Acute Cholecystitis (Liver Shock and Death) HENRY W CAVE. M D , New York

Tuberculosis of the Kidney Frank Hinman, M.D., San Francisco

Physiological and Pathological Changes in the Urinary Tract during Pregnancy J MASON HUNDLEY. JR , M D , Baltimore

Acute Pancreatitis IRVIN ABELL, M D , Louisville

Fracture Oration William O'NEILL SHERMAN, M.D. Pittsburgh

Community Health Meeting-Friday, 8 oo P M -Ballroom, Stevens Hotel

Program in preparation

ANNUAL HOSPITAL STANDARDIZATION CONFERENCE

Monday 10 00-Ballroom, Stevens Hotel EUGENE H POOL, M D , New York, President American College of Surgeons, presiding

President's Address

Report of the 1937 Survey of Hospitals and Official Announcement of the Approved List George Crille, M D, Cleveland, Chairman, Board of Regents Ameri can College of Surgeons

The Approved Hospital and Its Obligation—Diagnosis and Therapy, Education, Prevention and Research BERT W CALDWELL, M D , Chicago

Personality and Psychology in the Hospital G HARVEY
AGNEW M D Toronto

Critera to be Observed When Selecting Internes and Residents JAMES H MEANS M D, BOSton The Effect Hospital Insurance Plans Are Having on Medical and Hospital Services C Rufus Rorem Ph D, Chicago

Monday, 2 00 -Ballroom, Stevens Hotel

GEORGE E WILSON, M.B., Toronto Vice President American College of Surgeons presiding The Medical Staff Conference—with Panel Discussion from the Following Viewpoints

General Presentation of Subject HAROLD L FOSS, M D . Danville, Pa

Proper Attitude of the Medical Staff James T Nix. M D New Orleans Time, Place and Physical Essentials William H Walsh, M D Chicago

Conduct of the Conference EDWARD L TUONY, M D . Duluth, Minn

Criteria of a Good Medical Staff Conference FELIX P. MILLER, M D, El Paso, Texas

Demonstration-A model medical staff conference by the medical staff of Ravenswood Hospital Chicago

Tuesday, 10 00-Stevens Hotel

E WELDON YOUNG M D, Scattle, Wash, presiding Chincal Departments of the Hospital, Embracing Organization, Direction Control, Functioning Oral Surgery and the Dental Department in the General Hospital William H G Loran, M D, Chicago

W HAMILTON, M D, New York
The Physical Therapy Department in Small, Medium and Large General Hospitals JOHN S COULTER, M D ,

Chicago

The Out patient Department in the General Hospital, CHRISTOPHER G TARNALL, M.D. Rochester > 1 The Obstetrical Department in the General Hospital OTTO H SCHWARZ, M D St Louis.

Tuesday 2 00-Stevens Hotel

FRED G CARTER M D Cincinnata presiding Hospital Personnel Management-with Panel Discussion from Various Viewpoints

General presentation of subject. FRANK I WALTER. Denver Selection E MURIEL ANSCORBE R.A. St Louis.

Physical Health, HAROLD L SCAMMELL M.D. Halifax Assignment of Duties. CLINTON F. SMITH. Chicago.

Working and Living Conditions Joseph G Yorki Milwaukce Morale MACIE \ KNAPP R. \ \ormal III

Training and Education of Hospital Personnel George OHANLON M.D. Jersey City \ J

Tuesday 8 00 pm -Stevens Hitel

Joint Session-with Chicago Hospital Association and Chicago Hospital Council. CHARLES H SCHWEPPE Chi cago presiding

Public Relations-with Panel Discus ion from the Follow ing Viewpoints General presentation of subject. Press applement

Chicago The Ho-pital Administrator ADA BELLE McCLEERS R & Evanston III

The Member of the Medical Staff FREDERIC J COTTON M D Boston

Fund Raising D ALLAN CRAIG M D, Torrington Conn

Il ednesday 10 00-Sievens Hotel Joint Session-with Association of Record Librarians of North America R C Burner M D. Madison Wis

presiding Developing a Medical Record Consciousness in the Hos-SISTER M PATRICIA OSB BS RRL pital

Duluth Minn. What Constitutes a Proper Appraisal of the Medical Record CHARLES B PUESTON MD Chicago and Lillian H ERICKSON R R.L. Milwaukee

Incomplete Medical Records—Causes and Remedies
ALICE G KIEKLAND R.R.I. Oakland Calif
The Persuperative Value of Good Medical Records.

RICHARO B DAVIS M D Greensboro N C

The Technique of Making Group Studies of Di-eases THOMAS R PONTON M D Chicago

Sketch-The Medical Record Librarian's Dream Comes True Presented by the Medical Record Librarians of Chicago

II ednesday - 00

Demonstrations in the following Chicago hospitals Chicago Memorial, Children's Memorial Cook County Grant, Henrotin Michael Reese Pa savant Memorial, Presbyterian Ravensword Research and Educational. St. Elizabeth's St Joseph's St. Like's St. Mary of Chicago Chinics Wesley Memorial West Suburban

Thursday 10 00-Stevens Hotel

Panel Round Table Conference-Pertinent Problems Pe lating to Hospital Administration and Hospital Stand ardization. Conducted by ROBERT JOLLY Houlton Texas and R. C. BURERI, M. D. Madison Wis. Call Systems for Hospitals. JOHN GORRELL, M. D. Grand

Rapids Mich. Administrative Problems of the Small Hospital Glapts

BRANDT R. \ Logan.port Ind. Nursing Service States Mary Lipwing Chicago

Medical Social Service Standards Baserre Jenvings Air-Conditioning in Hospitals, PERRY W. SWERN Chicago

Hospital Income Basce L Twitte Dallas Texas. Technical Service Standards in the Hospital CLAUDE W MENGER M D. New York

Thursday 2 00-Steens Hotel Standardization of Hospital Furnishings, Equipment and

Supplies. L. M. ARROWSMITH, Brooklyn.
Food Service Mizzum C. CONNELLY Baltimore Professional Problems of the Small Hospital. Mary E. SEROCH R.N. Varquette Mich. Out patient Department. FREDERICK MACCURDY M.D.

New York The Cancer Clinic in the General Hospital. Frank E. Apar MD New York.

The Hospital Pharmaty EDGAR C HAYBOW Paterson The Front Office of the Hospital Lte C Guyunz, Little Rock Ark.

Friday

An opportunity will be afforded the hospital delegates to valit Chicago hospitals Special information pertaining to each institution will be available at the hospital registra tion and information desk.

PRELIMINARY CLINICAL PROGRAM

ARRANGED IN THE FOLLOWING SUBDIVISIONS GENERAL SURGERY, GYNECOLOGY AND OBSTETRICS, GENITO-URINARY SURGERY, FRACTURES AND TRAUMATIC SURGERY, PLASTIC AND FACIOMAXILLARY SURGERY, NEUROSURGERY, THORACIC SURGERY, TUMORS AND IRRADIATION, ROENTGENOLOGY, PHYSICAL THERAPY, EXPERIMENTAL SURGERY, OPHTHALMOLOGY, OTOLARYNGOLOGY

GENERAL SURGERY

Monday Afternoon CHICAGO MEMORIAL HOSPITAL

CHARLES J DRUECK, SR, GEORGE L BROOKS, OTTO SAPHIR and GEORGE LANDAU Symposium Carcinoma of the rectum, carcinoma of the colon CHARLES E KAHLLE, GEORGE L BROOKS, OTTO SAPHIR and George Landau Symposium Pentic ulcer

PASSAVANT MEMORIAL HOSPITAL

SUMMER L KOCH, MICHAEL L MASON and HARVEY S
ALLEN Surgery of the hand Dupuytren's contracture
Von Volkmann's contracture, nerve and tendon suture, hurn contractures of the hand and plastic repair with skin grafts chronic tenosynovitis

ST ANTHONY DE PADUA HOSPITAL

R C DRURY Spinal anesthesia

ST BERNARD'S HOSPITAL R J Fasro Blood transfusion, ments of accepted

WOMEN AND CHILDREN'S HOSPITAL CLEMENTINE FRANKOWSKI and HELEN M. KOSTKA. Van. cose veins, treatment by injection and by ligation

> Tuesday Morning AUGUSTANA HOSPITAL

N M PERCY Operations

ALBERT MERRITT BILLINGS HOSPITAL

Clinical Demonstrations LESTER R DRAGSTEDT and staff Clinical and experimen

tal studies in gastric and duodenal ulcer MALTER L PALMER, F L TEMPLETON and RUDOLF SCHINGLER A ray and gastroscopic studies of gastric ulcer under medical treatment

A BRUNSCHWIG Pancreatoduodenectomy for carcinoma

of the head of the pancreas If P JENKINS Abdominal wound disruptions and the durability of catgut sutures

CHICAGO MEMORIAL HOSPITAL

CHARLES E KAHLAE Stomach surgery CHARLES J DRUECK, SR Surgery of the colon and rectum COOK COUNTY HOSPITAL

KARL A MEYER, R II JAFFE, M J HUBENY AARON ARKIN and RUDOLF SCHINDLER Symposium Surgery of the stomach Operations

DR GATEWOOD Children's surgery
GEORGE G DAVIS ALBERT II MONTGOMERY, JOHN

HARGER, HARRY JACKSON and JOHN G FROST OPERA

Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs in the labora tories of the Graduate School of Medicine, 427 S Honore Street

EVANGELICAL DEACONFSS HOSPITAI EDWARD N HEACOCK Cholecystectomy

GARFIELD PARK HOSPITAL

EDMUND FOLEY, PAUL SCHMITT, HAROLD WAIT, SAMULL PLICE, CLAUDE WELDY and FRED DESTEFANO Sym nosium Gall bladder disease

HOLY CROSS HOSPITAL

V F TORCZYNSKI Cholecystectomy, appendectomy, hys

M J BADZMIEROWSKI Thyroidectomy, 5 cases, cholecys tectoms I P DyBALSKI Cholecystectomy, 3 cases, nephrectomy,

hysterectomy

A J MANTLAS Appendectomy

JACKSON PARK HOSPITAL

G M Lucas Clinic, W Morley Sugrin Gall bladder surgery Symposium Appendicitis

A BAMBERGER Surgical aspect R R JAMIESON Medical aspect J MOORE Pathological aspect

LUTHERAN DEACONESS HOSPITAL JOHN D LOUCKY, G H MAMMEN and GEORGE H

SCHEOEDER Operations

MERCY HOSPITAL

Dry Clinic C F Sawyer and associates Unusual causes of intestinal obstruction, partial and complete gastrectomy

M McGuire and associates Pelvic appendicitis, obstructive jaundice

MOUNT SINAI HOSPITAL

V SCHRAGER Operations

J GAULT Technique of high internal saphenous vein liga tion P KAPLAN Demonstration of tubulovalvular gastros

tomy PRESBYTERIAN HOSPITAL

KELLOGG SPEED, ALBERT H MONTGOMERY, DR GATE wood and associates Operations

V C DAVID, C B DAVIS and E M MILLER Dry clinics and symposia

RAVENSWOOD HOSPITAL

Dry Clinic

P J SARMA Varicose veins, ligation and obliterative treatment

R L DYER End results of gastro enterostomies, dem onstration of cases D B POWD and R I GREENING Treatment of osteomye

J J Moore Tumors of breast
D L JENNINSON X ray interpretations GEORGE DE TARNOWSKY Exstrophy of bladder C J GLIGER Ectopic ureter and absence of vagina cerva

cal carcinomas

M. W. Field Obstetne practice by general practitioner
W. F. Grosvevor Toxemia in pregnancy
W. C. HAMMOND Endometriosis

W C HAMMOND Endometriosis

WICHAEL PEESE HOSPITAI

MICHAEL PEESE HOSPITAI

D C STRAIS Thyroid operations

B BETTHAN and WILLIAM TAN ENBAUM Call bladder surgery

A A STRAUSS Gastro intestinal surgery JAMES PATEIDE Operations P SHAPERO Operations

270

Symposium Gastro intestinal diseases
A A Strates Surgical treatment of peptic wher
S Strauss Pre and postoperative care of the ulcer pa

JAMES PATEJOL. Perforating ulcer surgical treatment JACOB MEYER Medical care of the ulcer patient

Symposium Carcinoma of the restum
A A STRAUSS Surgical

S STRAUSS burgued diathermy, after care and results of surgual diathermy

M APPEL Histocytic variation in cancer tissue GLESTAY KOLISHER History of surgical diathermy Otto Sapher Pathology of the rectum following surgical diathermy

RESEARCH AND EDUCATIONAL HOSPITALS

CERA DETAKATS Lumbar sympath-ctomy operation
Symposium Neurocirculatory Diseases
R BRUNER The use of neosynephane in spinal anesthesia
NILLIAM L BECK Selection of cases for sympathectomy

demonstration of sympathectomized patients evaluation of results, management of lymphedema

F. K. Hick. Vascular accidents associated with coronary

occlusion

H C Li eth Unusual reactions following the use of intro

glycerine
CEZA DETAKATS Treatment of acute arterial occlusion,
operablists of hypertension demonstration of cases
P J SARMA and H L MISSIRIN The treatment of varyose
vens and ulters

J T REVOLDS Amputations in peripheral vascular dis-

ST ANTHONY DE PADUA HOSPITAL

JOSEPH ZABORATORY Operations ST BERNARD'S HOSPITAL

ST BERNARD'S HOSPITAL

J T Meyer E J Meyer and R J Meyer Thyroidec
tomy

tom)

V. G. EPSTEIN and V. MENNITE. Abdominal surgery and differential diagnosis of acute abdominal addressors.

ST JOSEPH'S HOSPITAL
WILLIAM C BECK Thoracic surgery
AUSTIN A HAYDEN Conservation of hearing, mastered and

Sinus surgery
Architecto Hoyne Control of contagion in surgical dis-

CASES
WHILLIAM H G LOGAN Oral surgery
FRANKLIN B MCCARTY Gall bladder surgery
CHARLES M MCKENNA Undescended texticle
Huggi Blekenna Fractures Conservative surgery in dia

bette gangrene
FRANK THEIS Peripheral circulatory diseases
Pathological and radiological material illustrating

Pathological and radiological material illustrating the above will be presented by LAWRENCE HINES pathologist and WILLIAM E. ANSPACH radiologist

ST MARY OF NAZARETH HOSPITAL GEORGE MURLIER Regional ileits

VETERANS ADMINISTRATION PACILITY
PACE F BROWN Operations

WASHINGTON BOULEVARD HOSPITAL ARTHUR R. METZ General surgery and fractures

WESLEY MEMORIAL HOSPITAL

P W McNealy, Emory Strauser and F L Hussey
Gastne surgery

Tuesday Afternoon
CHICAGO MEMORIAL HOSPITAL

BENNETT R PARKER Thyroid surgery

COOK COUNTY HOSPITAL
EDWARD J LEWIS Operations

NEO J LEWIS Operations

HOLY CROSS HOSPITAL

M J BADEAUEROV SKI Pre and portoperative treatment
of thyroid disease

JACI SON PARF HOSPITAL
HARRY E L THEY Operations

MERCY HOSPITAL

C L MARTIN Symposium Rectal neoplasms and in flammations J E KELLEY The hernia problem

PASSAVANT MEMORIAL HOSPITAL

| R BECHBINDER A C IVY and ARTHUR BYFIELD

Symposium on the bihary tract
MICHAEL REESE HOSPITAL

Dry Clinic

ATHAN CROHN The use and abuse of the injection treat
ment of herma suitable and unsuitable cases method
LEO ZIMMERAN Sarpical treatment of direct ingunal

hernia
RUDOLF SCHINDLER The use of the gastroscope and its
value to the surgeon

SANTER GOLDBERG Pooled human convalescent serum treatment of surgical streptococcus hemolyticus infections JAMES PATEIDL Congenital duodenal obstruction in new

James Parejut. Congenital duodenal obstruction in ne bora duodenal diverticuli causing clinical symptoms Dry Clinic

LEO ZIMMERNAN Diseases of veins
PHILIP SHAFIRO
Recent advances in the treatment of

SANCEL PERSON Surgical measures used in the treatment

of peripheral circulatory disturbances, differentiation between arterial and arteriolar spasticity as an aid in the selection of cases for sympathetic ganghonectomy

ST LUKE'S HOSPITAL
GEZA DETAKATS GEORGE SOUPHAM GEORGE K FENN

CARL JOHNSON and RICHARD CAPPS Surgery of cardiohascular di cases

ST MAPA OF NAZARETH HOSPITAL
P DOBLETT and T PLANT Abdominal operative clame

VETERANS ADMINISTRATION FACILITY
PART F BROWN Symposium Stomach surgery

WOMEN AND CHILDREN'S HOSPITAL

Management of Diseases Complicating Surgery CAROLAN MACDONALD Syphilis
ROSE MENEVDIAN Endocrine disorders

RUTH RENTER DARROW Diabetes

Wednesday Morning AUGUSTANA HOSPITAL

4 T LUNDUREN, EARL GARSIDE, R J E ODEN and J W Nuzum Operations

CHICAGO MEMORIAL HOSPITAL

PETER S CLARL, VANCE RANSON GEORGE LANDAU and OTTO SAPRIR Gall bladder symposium LEO M ZIMMERMAN and RICHARD L HELLER Fundamen tal problems in the surgical treatment of inguinal herma,

modern management of varicose veins CHILDREN'S MEMORIAL HOSPITAL

A. H MONTGOMERY, J IRELAND, J GRAHAM, W POTTS, A Diggs and J Mussit. Operations and demonstration of cases

COLUMBUS HOSPITAL

D A ORTH and E NORA Bone and joint tuberculosis, peritonitis, Rollier treatment

COOK COUNTY HOSPITAL

RAYMOND W McNealy Manuel Lichtenstein Fred erick Tice Richard H Jaffe and M J Hubeny Symposium Diseases of the gall bladder Raymond W McNeald, Victor Schrader George L Affelberg, Roger T Vaughan and Marshall Dauson Operations

Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs in the labor atories of the Graduate School of Medicine 427 S Honore Street

EVANSTON HOSPITAL

Symposium Colon Surgery L D SVORF Diagnosis

E R CROWDER Roentgenology E L BENJAMA Pathology

FREDERICE CHRISTOPHER Surgery W R PARKES Prognosis in malignancy

Dry Clinic MARCUS HOBART Operative treatment of low back paid

JAMES GRIER Common bile duct obstructions W K JEVYINGS Prevention of recurrence in lemoral bernia operations

HOLY CROSS HOSPITAL

CHARLES M McKenna Cholecystectomy hermorrhaphy

J F DYBALSKI Open reduction of fracture of femur E KEAFT Hysterectomy permeorthaphy F SALETTA Hysterectomy, permeorrhaphy, operation for

shortening round ligament M STRIKOL Appendectomy, bermorrhaphy

IACKSON PARK HOSPITAL

ARRIE BAMBERGER Pre and postoperative treatment of surgical cases C C CLARK and H HOYT CON Operations

LUTHERAN DEACONESS HOSPITAL

GEORGE O SOLEM. Surgical indications in peptic ulcer

MOTHER CABRINI HOSPITAL EUGENE J CHESROW and ALBERT J CHLSROW Opera

E P OLIVIERI and N V EMANUELE Demonstration clinic

MOUNT SINAI HOSPITAL

E I GREEVE Anaerobic hemolytic streptococcus infec tion (Meleney's disease) JACOB M MORA Thyroidectomy in the aged

D WILLIS Removal of foreign (metallic) bodies from

tissues with aid of a new instrument M GREENE Acute intestinal obstruction

I TRACE. Postoperative pulmonary complications with

special reference to massive pulmonary collapse M L ARLIN The surgical diabetic

L EDIDIN and N I FOX Medicosurgical discussion L PELDMAN Streptococcic bacteriemia precipitated by surgical procedures

MUNICIPAL TUBERCULOSIS SANITARIUM

CLEMENT L MARTIN Anorectal tuberculosis MAT THOREX Surgery in tuberculous patients

POSTGRADUATE HOSPITAL

EMIL RIES Episacro iliac lipomas with backache

PPESBATERIAN HOSPITAL

V C. DAVID, KELLOGG SPLED, C B DAVIS, DR GATE WOOD, E M MILLER, A H MONTGOMERY and asso ciates Operations

MICHAEL REESE HOSPITAL

M L PARKER, LEO ZIMMERMAN and SAMUEL GOLDBERG Operations B PORTIS Thyroid surgers

SAMUEL PERLOW Peripherovascular surgery

A A STRAUSS, S STRAUSS and I PATEIDL Gastro intes tinal surgery

RALPH B BETTMAN and WILLIAM TANNENBAUM Gall bladder operations

Dry Chaic Surgery of the Gall Bladder Samuel Sosain The preparation of the liver for surgery R A ARENS The technique of cholecystography
1 M Serbi, S Portis and G Licentesstery The evalu

ation of liver function tests, gall bladder diet, survey of postoperative results of the gall bladder group

RALPH B BETTMAN, LEO ZIMMERMAN and WILLIAM TAN NEVBAUM Motion picture and diagrammatic demon strations The technique of cholecystectomy, choledocos

tomy, choledochogastrostomy or enterostomy RESEARCH AND EDUCATIONAL HOSPITALS

W H COLE Thyroidectomy, operation for pyloric obstruction P J SARMA and H L MISHAIN Clinic on varicose veins

Symposium Diseases of the Thyroid W H Core Pre operative care and postoperative com

plications
C B Puesrow Use of salk in thy roidectomy
L Seed and R Brewer Blood pressure studies during

thyroidectomy J M Mora Hepatic damage in hyperthyroidism

R W KEETOV Cardiac complications of hyperthyroidism

WH Cole Tracheal collapse
John Home The thyroid gland as observed at autopsy in

patients with diseases other than hyperthyroidism I H BAILEY Bacteriological studies in the operating

room

ST ANNE'S HOSPITAL

THOMAS E MEANY Fractures and tendon transplanta-

JOHN L KNAPP and JOHN W KEANE Surgical clinic. demonstration of cases

GEORGE F THOMPSON Surgical clinic, demonstration of cases

ST ANTHON: DE PADUA HOSPITAL S E DOVLOV and H F SULLIVAN Operators and demonstration of cases

ST BEPNARDS HOSPITAL

G M Cosmon The surgical treatment of perforated gastric ulcer

ST LUKES HOSPITAL

H E JOVES WILL LYOV WILLIAM R Crashs and associates Operations

U S MARINE HOSPITAL

O E NADEAU Results in hernia surgery E C Lustrov and R W FLVN Spinal anesthesia demonstration

WESLEY MEMORIAL HOSPITAL WILLIAM MILLER Review of rall bladder surrery

FRANCES E WILLARD HOSPITAL VICTOR L. SCHRAGER Clinic

WOMEN AND CHILDREN'S HOSPITAL PEARL M STETLER Abdomiral unlery

Il ednesday Isternoon

COLUMBUS HOSPITAL D A ORTH C I SCHERIBEL and F D NorA Expen mental thyrotoxicosis I L SPINALE Valve operation

MICHAEL REESE HOSPITAL Symposium

SAMLEL PREEON Paravertebral alcohol injections for the relief of cardine pain LEO ZIMMERMAN and OFTO SAPHER Benign tumors of the

the rold gland SANLLE GREDEER Acute mesentene lymphadenius strangulated bermas in oremature infacts
Thomas I Meran Rectal complications of lympho-

granuloma inguinale V. L. PARLER Carcinoma of the large bowel.

ST ANNES HOSPITAL

HARRY J DOOLFY Urological clima demonstration of

JOHN J CEARL and E P GRAMER Surgical choic dem onstration of cases

AT BERNARD'S HOSPITAL

HERMAN DEFEO The medical management of cholecystic diseases B C Cusmusy and associates Roentgen studies of gall bladde diseases

5 L GOVERNALE Cholecystotomy versus cholecy tec tomy CRESTER GLY Pathology of the gall bladder

ST LUKES HOSPITAL

S W Ma larman and associates. Bile tract and colon suiteerv

WESLEY MEMORIAL HOSPITYL GOY S VAN ALSTYNE Abdominal surgery

FRANCES F. WILLARD HOSPITAL LOUIS F PLEAK Clinic

Thursday Morning AUGUSTAN I HOSPITAL

N W PERCY Operations

CHICAGO MEMORIAL HOSPITAL

PETER S CLARK, LEO M ZUCKERMAN and M L. WELL STERY Gall bladder surgery

COOK COUNTY HOSPITAL RICHARD H. JAFFE Pathological conference KARL A. MEYER GEORGE G DAVIS ALBERT H. MOYT COMERY and MAX THOREK. Operations Members of the surgical staff will give demonstrations

in surgical technique upon cadavers and dogs in the saboratories of the Graduate School of Medicine 427 5 Honore Street

EN INGELICAL DEACONESS HOSPITAL loav I I am Stomach resection

HOLY CROSS HOSPITAL

I FRANCIS Ruste Choledochotomy and dilutation of common duct vaginal bysterectomy cholecystectomy J Francis Rezic D DiCtro and Walter Lisen Pesec tion of superior bypogastric ganglion D DiCino kidney proplasm.
FRANCIS STREYSMAN Varioocelectomy
JOHN SIMO MITS Pelvic laparutomy

ILLINOIS MASONIC HOSPITAL

CHARLES DECECE. Pruntus ani-cases due to systemic disturbances Ovarian disfunction (vicarious pruntus) hypothyroidum spastic colon obesits

JACKSON PARK HOSPITAL GEORGE M LECAS Operations

LUTHERAN DEACONESS HOSPITAL loss D Roccey G H Manuel and George H SCHROEDER OFFICIORS

MERCY HOSPITAL

L D MOORHEAD Sympo num Guiter

PASSALANT MEMORIAL HOSPITAL PAUL STARR Sympo num Diseases of the endocrine glands

PLESBI TERIAN HOSPITAL C Davin C B Davis Unitar Minited and asso

cutes. Operations KELLOY & SPEED DR GATEWOOD AND A H MONTGOMERY Dr. chairs and symposia

MICHAEL REESE HOSPITAL A A. STRAKES and S STRAKES Gastro-intestinal surgery

D C STRAL's General surgery Thyroid Symposium

O C Strats Group study and demonstration of thyroid

records surgical management of hyperthyroidim
5 Sosars. The endocrine disturbance in thyroid disease

L N KATZ Dis arbed physiclogy of the cardiovascular system in thyroid disease

M Les Some chairal aspects of the heart in hyper thyroidism, medical management of h) perthyroidism A S Bom the and L \ Latz The electrocardiogram in

shroud disease B HAUSTBORR Arrhythmias in thyroid disease R Porris Outpatient clinic management of hyperthy roidism

B Portis and H Roth Treatment of hyperthyroidism complicated by pregnancy and syphilis

R LEVINE Experimental treatment of hyperthyroidism

RESEARCH AND EDUCATIONAL HOSPITALS C. B. Puestow Operations Choledochostomy, carcino ma of rectum

Symposium Gall Bladder Direases

C B Pueston The effect of cholecystectomy on pressure in the choledochus, gall bladder fistulæ EDMUND FOLEY Differential diagnosis between intra

hepatic and extrahepatic jaundice
W H Cole. The role of cy, tie duct obstruction to gall

bladder disease

A HARTUNG The advantage of combining gastro intes tinal series with cholecystography

ST ANTHONY DE PADUA HOSPITAL

F B OLENTINE Operations and demonstration of gotter and abdominal sutrery cases

ST JOSEPH'S HOSPITAL

WILLIAM C BECK Thoracic surgery Austin A Hayden Conservation of hearing mastoid and

Sinus surgery
ARCHIBALD HOYYE Control of contagion in surgical dis

WILLIAM H G LOGAN Oral surgery FRANKLIN B MICCARIN Gall bladder surgery CHARLES M MCKENNA Undescended testicle

HUGH MCKENNA Fractures conservative surgery in dia betic gangrene

FRANK THEIS Peripheral circulatory diseases Pathological and radiological material illustrating the above will be presented by LAWRENCE HINES pathologist

and WILLIAM E ANSPACH, radiologist

ST MARY OF NAZARETH HOSPITAL J C HILL Pathologic discussion of operative findings T LARKOWSKI Symposium Hernias and their repair

VETERANS ADMINISTRATION FACILITY PAUL F BROWS Operations

WESLEY MEMORIAL HOSPITAL

R W McNealy and associates Surgery of jaundiced patients

GUYS VAN AUSTYNE Caremoma of the breast, combined surgical and x ray treatment

FRANCES E WILLARD HOSPITAL A E STEWART Chric

WOMEN AND CHILOREN'S HOSPITAL PEARL M STETLER and MARIE ORTHAYER Gastro intestinal clinic gastroscopic technique Alice Conkein Thyrodectomy ESTHER RAIN Repair of ventral herms

> Thursday Afternoon CHICAGO MEMORIAL HOSPITAL

BENNETT R PARLER, LEO M ZIMMERMAN WALTER S PRIEST, OTTO SAPHIR and GEORGE VI LANDAU Sym posium Thyroid disease FRANA WRIGHT, ALBERT ZRUNEA LEG M ZIMMERMAN,

M L WEINSTEIN and OTTO SAPITE Symposium Blood transfusion

COOK COUNTY HOSPITAL RAEPH R RETTHAN and EDWARD I LEWIS Operations

HOLY CROSS HOSPITAL

I FRANCIS Ruzic Bulsary tract surgers

MICHAEL REESE HOSPITAL Symposium Gastro Intestinal Surgery

LEON BLOCH The medical treatment of ulcerative colitis A A STRAISS The surgical management of ulcerative cobts

S STRAUSS The use of ileostomy in ulcerative colitis and carcinoma of the colon

OTTO SAPHIP Pathology of ulcerative colifis Discussion R ARENS & ray diagnosis of ulcerative colitis and peptic

nicer Discussion A A STRAUSS and H F BINSWANGER Medical and

surgical treatment of terminal ileitis

RESEARCH AND EDUCATIONAL HOSPITALS Symposium Diseases of the Gastro Intestinal Tract George Milles Pathology of carcinoma of stomach W H Core Total gastrectomy I Wachowski X ray diagnosis of carcinoma of

stomach L BIRCH Anemia associated with total gastrectomy

M H STREICHER Diagnosis of carcinoma of the rectum C B Puesrow Surgical treatment of carcinoma of the

BERNAPO PORTIS Surgical treatment of complicated duodenal ulcers F L McMittan Regional ileitis

J L Sprvack Tubovalvular stoma with particular refer ence to gastrostomy

H O WERVICKE The injection treatment of hernix

ST ANTHONY DE PADUA HOSPITAL

W H BRADLEY Operations ST BERNARD'S HOSPITAL

W S HECTOR and S S Dunova Imperforate anus with atresia of large bonel

ST MARY OF NAZARETH HOSPITAL

A PARTIPILO Aseptic gastro intestinal anastomosis P CZWALINSKI Surgical incisions

TENOZAR Abdominal operations

WESLEY MEMORIAL HOSPITAL

E B PERRY and H E E BARNARD Abdominal surgery FRANCES E WILLARD HOSPITAL

OTIS M WALTER Clinic

WOMEN AND CHILDREN'S HOSPITAL EMELIA GIRYDTAS Cholecystectomy

Friday Morning

ALBERT MERRITT BILLINGS HOSPITAL

Presentation on Surgery and the Circulation H LIVINGSTONE Anesthesia and the circulation N ROOME, H WILSON, H N HARLINS and D B PHE MISTER Studies in causes and treatment of surgical shock

Il f Anaxs Intrathoracic operation and the circulation

COLUMBUS HOSPITAL

M J SEIFERT and F X O MALLEY Gastro intestinal sur gery

COOK COUNTY HOSPITAL

DE GATERIOOD Children's surgery RALPH C SULLIN AN VERNON C DAVID HARRY JACKSON

and Frank J Hera Operations
Members of the surgical staff will give demonstrations
in agrical technique upon cadavers and dogs in the laboratories of the Graduate School of Medicine 417 S Honore
Street

HOLY CROSS HOSPITAL

FRANK FRAIDER and Aicholas Payteric Hysterectomy cesarran section cholecystectomy

Sterney Buzis Cholecystectomy hysterectomy repair of incisional hermia

FELLX WINSET'MS Inguinal hemiorchaphy JAMES GALLAGUER Cholecystectomy WILLIAM RELLEY Cholecystectomy and appendectomy WI BARRIERON SKI and H LEAGE Hysterectomy

ILLINOIS MASONIC HOSPITAL

CRASSES II PARKES CARE F STEXTOTOTE and BACTES C BORN-LUBERS Suppoid ablottes—origination of the service for the case of the surposal dishetic where an intuitate relationship exists between the surposal order interest which he greater than that of a consultation returned of case on arrive for past timp years presentation and the surposal part of the past timp years presentation intuits are three or persons of the past of the past lower extension.

Jone, R. Hunzk and Jone, H. Unitone. Gall bladder surgery—bustyry building. Personal bustory in detail laboratory findings and practical values of various retails a ray development to date in this diagnosist field dem onstration of operative technique with use of pendural order for anotheram in the ossess discussion of advantages of pendural anosthesis over spinal and lessening of buz ard greater sutilaction than with any type of general

JACKSON PARK HOSPITAL ARRIE BARBERGER H HOLT COVARD C CLARA OPERA

tions

LUTHERAN DEACONESS HOSPITAL

JOHN D KOLCEY & H MARKEY and GEORGE H SCHROEDER Operations GEORGE O Solem Surgical indications in peptic ulter

GEORGE O WEEK SUIGHED MORAHOWS IN POPUL MAN

MOUNT SINAL HOSPITAL A A STRACES S F STRACES and B SAVRE Operations

VI LEWISON Surgery in patients with cardiovascular diseases
H I Isaacs (organizeducase simulating acute abdomi

H I Isaacs Coronary disease simulating acute abdome nal catastrophies

i. B Freiten burgery in tuberculosis I Davidson Clinical pathological conference

PASSAVANT MEMORIAL HOSPITAL SAMUEL J. Foreignes Experimental surpical problems

POSTGRADUATE HOSPITAL

L ZINDERMAN Vancose veins and their complications

PRESBITERIAN HOSPITAL

1 C DAVID KELLOGG SPEED C B DAVIS DE GATE ROOD WILLIAM MILLER and A H MONTGOMERY Operations MICHAEL REESE HOSPITAL

J PATEIDL P SEATER R. CRAWFORD B PORTIS S GOLDBERG W L PARKER and LEO ZIMMERMAN Oper ations

RESEARCH AND EDUCATIONAL HOSPITALS
R B MALCOLM Operatine clinic Nerk dissection earn
norms of breast surgical pathology of breast tumors,
Clinical Demonstration

T J Wachouses A ray treatment of carcinoma of the breast Apase Bauneroes Ewing lumor with case report

Asset Bauerbore Ewing tumor with case report S R Rosenthal. The toxin and arbitorin of burns R H Cole Acute pancreatitis

ST ANTHONA DE PADUA HOSPITAL

J J SPRAFAA Abdominal surgery and demonstration of
cases

ST ELIZABETH'S HOSPITAL E D Kaleelage Thoroid disease

ST LUKES HOSPITAL

E W Hirson E JENEINSON and staff Staff clinic

WESLEY MEMORIAL HOSPITAL Exec Latimer Unusual breast tumors

Friday Afternoon
COOK COUNTY HOSPITAL

J G FROST Operations
LEWISE L LOCK Surgery of the hand
I H WARSERSLE Operations

HOLY CROSS HOSPITAL

Eura Wates Splenomegali IACKSON PARA HOSPITAL

HARRY E L Thur Operations

MOUNT SIN II HOSPITAL

f Daymoon: Differential diagnosis of infectious monoaucleosis simulating surgical conditions demonstration of technique

ST BERNARDS HOSPITAL

J M Manovey Infective granuloms of the recum simulating a neoplasm case demonstration

ST ELEXABETH'S HOSPITAL

J K \text Pre and postoperative intravenous admin intration of fat emulsion

Do) to be Announced COOK COUNTY HOSPITAL

VICTOR I. SCHRICER Symposium Appendicuts
SCHYLE I. NOW Symposium Hand infections
Harry IGNOS Symposium Skull fractions
Harry IGNOS Symposium Children's surgery
FREDERICK OF DAYS Symposium Performance
Marswal Divisor Symposium Objectses of the thyroid
cland

VERNON C DAVID Symposium Surgery of the large bowel

HENROTTN HOSPITAL JOHN & GRANAU Demonstration china

GVNECOLOGY AND OBSTETRICS

Monday Afternoon

CHICAGO LYING IN HOSPITAL

FRED L ADAIR and staff Motion picture demonstration of cesarean section

COOK COUNTY HOSPITAL

FREDERICK H FALLS Operations A F LASH Puerperal sepsis, ward wall.

HOLY CROSS HOSPITAL

PAUL LAWLER Application of obstetrical forcers (mani kin demonstration)

ILLINOIS MASONIC HOSPITAL

HARDID W MILLER and WALTER BORNEMETER Ovarian cysts, uterine fibroids Dry clinic for demonstration of cases and general discussion, operation during which use and value of peritoneoscope will be demonstrated

F O Bowe and BEULAH WALLIN Cesarean section Inda cations, comparison of results in different types, demon stration of operative technique of low cesarean section

ST BERNARD'S HOSPITAL

E A RACH and F J STUCKER Cesarean section

WOMEN AND CHILDREN'S HOSPITAL ANNIE E BLOUNT Operations

Tuesday Morning

CHICAGO LYING IN HOSPITAL

FRED L ADAIR, WILLIAM J DIECKMANN, M EDWARD DAVIS, H C HESSELTINE and staff Cesarean section Motion picture demonstration of colpocleisis operation

COOK COUNTY HOSPITAL

CAREY CULBERTSON and A E KANTER Operations D S HILLIS Treatment of abortion, ward walk

PRESBYTERIAN HOSPITAL

N S HEANEY, CAREY CULBERTSON, A E KANTER, E D
ALLEN and H BOYSEN Operations

MICHAEL REESE HOSPITAL

J L BAER, J E LACKNER, WILLIAM RUBOVITS, I F STEIN and RALPH REIS Operations

ST LUKE'S HOSPITAL

H O Jones and associates Clinic

WESLEY MEMORIAL HOSPITAL MARK GOLDSTIVE and associates Uterine bleeding

FRANCES E WILLARD HOSPITAL ASCHER H GOLDFINE Clinic

WOMEN AND CHILDREN'S HOSPITAL MARY EDITH WILLIAMS Removal of abdominal and polyic

OTILLIE ZELEZNY Electrocoagulation of the cervix uters

Tuesday Afternoon

CHICAGO LYING IN HOSPITAL WILLIAM J DIECKMANN and staff Dry clinic Eclampsia Motion picture demonstration of forceps delivery

COOK COUNTY HOSPITAL

J P GREENHILL Operations
I RUDOLPH and J II BLOOMFIELD Symposium The toxemias of premancy

ST BERNARD'S HOSPITAL

S S SCHOCHET Fibroids

ST ELIZABETH'S HOSPITAL

I R LAVIERI Cesarean section

ST MARY OF NAZARETH HOSPITAL

I. KOZAKIEWICZ and M. UZNANSKI. Tovemias of preg.

FRANCES E WILLARD HOSPITAL ASCHER H GOLDFINE Clinic

WOMEN AND CHILDREN'S HOSPITAL

ELOISE PARSONS Vaginal hysterectomy, vaginal sterilization, ligation of tubes per vaginal route

Wednesday Morning CHICAGO LYING IN HOSPITAL

FRED L ADAIR, WILLIAM J DIECEMANN M EDWARD DAVIS H C HESSELTINE and staff Operations and demonstration of cases

COOK COUNTY HOSPITAL C W BARRETT Operations
J E FITZGERALD Heart disease in pregnancy, ward walk

EVANGELICAL DEACONESS HOSPITAL

A J SCHOENBERG Hysterectomy

JACASON PARK HOSPITAL
CHARLES F GRIENE, LOUIS H STERN, W J NIXON
DAVIS, JR and NORMAN ZOLLA Treatment of contract ed pelves by cesarean section, version and forceps

PASSAVANT MEMORIAL HOSPITAL GEORGE GARDNER and ARTHUR H CURTIS Gynecological pathology-demonstration and conference

PRESBYTERIAN HOSPITAL N S HEANEY, CAREY CULBERTSON, A D KANTER, E D

ALLEN and H BOYSEN Demonstration of cases RESEARCH AND EDUCATIONAL HOSPITALS

FREDERICK H FALLS Eclamptogenic tovemia, low cervical cesarean section under local anesthesia W H BROWNE Progestin in the treatment of abortion G H REZEK Modification of the Friedmann reaction

MICHAEL REESE HOSPITAL

Dry Chaic JOSEPH L BAER Shifting trends in the treatment of prolapse of the uterus

JULIUS E LACKNER Recent investigations in the action of progesterone

WILLIAM H RUBOVITS Postoperative vaginal antisepsis RAIDER F. STEIN Evaluation of the "safe period"
RAIPH A REIS Mammography
LESTER E FRANKENTHAL, JR Treatment of vulvovagi

nitis

กระการรากก

MICHAEL L. LEVENTHAL. The Manchester operation for the cu e of Cystocele and prolange HENRY BEXEAUR. The role of spermotorin in temperate

sterility A F LASH. Early diagnosis of carcinoms of the oterus. E. I DECOSTs. The use of progesterone in the prevention

of habitual abortion ALFRED J KOBAK. Maternal mortality in Chicago.
Hickias Straces. Routine valuation of the prefers during

hysterectomy

WESLEY MEMORIAL HOSPITAL

CHARLES B RELD WILLIAM B SERBINAND G C RICHARD Moving nicture demonstration of low forcess breech extraction with forcers on aftercoming head spontaneous breech-manual aid.

WOMEN AND CHILDREN'S HOSPITAL FLORES CE HARE. Prenatal care with reference to the haby RUTH R. DARROW Treatment of acterns graves. BERTHA I AN HOOSEN Maternity mortality

II ednesday Alternoon

CHICAGO LYING IN HOSPITAL H C HESSELTY'S and staff Assessovaleive to tema of prespancy Motion picture demonstration of birth mun

CHICAGO MEMORIAL HOSPITAL

PAUL M CLIVER JULIA C STRAW HARRY L MEYERS BEATRICE E TUCKER and MALTIE MEDIC Plante remair

JAMES E FITZGERALD WILLIAM F REWITT GEORGE > Scripp and Hanny Branco Cesarean section

COOK COUNTY HOSPITAL

II T CARLISTE Operations
D S Hillis J H Bloowfield and 4 F Lass. Symposium Cesartan section

RESEARCH AND EDUCATIONAL BOSINTALS FREDERICK H. FALLS and staff Operations Symposium Gynecological surnors
FREDERICK H. FALLS. Vulva carcinoma demonstration of cases vulvectomy under local anesthesia R. A LIPVENGARL Solid tumors of ovary removal of

otanan cyst H H HULL Early carcinoma of cervix

WOMEN AND CHILDREN'S HOSPITAL CONTANCE O BRITIS OPERATIONS BERTHA VAN HOUSEN and MACUE HALL WINNEST ARES

thesis in obstetries.

Beatrice E Trusca Parasacral anesthesis

Thursday Morning CHICAGO LYING-IN HOSPITAL

FRED L ADAMS WILLIAM J D'ECRUANA M EDWARD DAVES H. C. HESSELTIVE and JUST CESARIAN SECTION Motion picture demonstration of blood transfe ion

CHICAGO MEMORIAL HOSPITAL

PAUL M. CLIVER, JULIA C. STRAW. HARRY L. MEYERS BEATESCE E TUCKER and WALTER WINDER Symposum The treatment of prolapse of the uterus cystocele and rectoes e at carrous ages-

JAMES E FITZCERALD VILLAN F HEWITT GEORGE Schurr and Harry Branco Indications and technique for cesarean section perse block in obstetnes

COOK COUNTY HOSPITAL Ecoy W Fiscersons Operations

I E FITTGERALD and L REDOLPH. Symposium Ecton . presmaney its diagnosis and freatment.

MOUNT SINAI HOSPITAL A. H. KLAWANS, Endometrosia,

A E KANTER Musculinumning tumors of overy

A H. E. GOLDETVE C. NEWBERGER H. BUXBACK and associates Symposium Obstetrical hemorphages.

L Reporter Physiological and clinical a peri of occupa-

posterior position A. ARKIN I A RABEAS and R. GORDON Medicosurrical

PRESBYTLRIAN HOSPITAL

N S HEAVEY, CAREY CULBERTSON A E. KANTER E. D. ALLEN and H. BOYEL Operations ST ANTHONY DE PADUA HOSPITAL

M A. WEISSKOPP Operations

WASHINGTON LOULES AND HOSPITAL I AUL C Fox. Operations and demon-tration of cases WESLEY MEMORIAL HOSPITAL

MARK GOLDSTENZ and a sociates | Lambal playfox.

Thursday Alternoon CHICAGO LATE G IN HOSPITAL

M EDWARD DAVIS and staff Placenta pravia abruptio placents Motion picture demonstration of postpartum hemorrhage.

COOK COUSTS HOSPITAL

FREDERICK H. FALLS. Operations

] H. BLOOMTIELD and D. S. HILLS. Sympos., m. Late. hemorrhages of Dregnant

ST MARY OF VAZARETH HOSPITAL H. Little Ovanso tumors

Friday Mornine

CHICAGO LATAGAN HOSPITAL

FRED L. ADMR. WILLIAM I DESCRIPTED M. EDWARD DAVID H. C. HE.SELTINE and staff. Cesarean sects a. Dry clause

COOK COUNTY HOSPITAL

A. E. Kanter and Carey Currents Operations
A. F. Lasty Toxernas of preparers ward walk

PRESBYTERIAN HOSPITAL

S HEAVEY CARET CYCERTSON A E. KANTER E. D. ALLEN and H. BOYCEN Operations

MICHAEL REESE HOSPITAL J L. BARR J E. LACKNER, BILLIAN REBOVES I F. SPEIN and RALPH REES. Operations

ST BERNARDS HOSPITAL

I B HARBERTE Hysterectomy and its indications

RESTEL MEMORIAL HOSPITAL CHARLES B REED WILLIAM B SERBINAND G C RICHARDson Ublatuo placenta placenta przyna.

WOMEN AND CHILDREN'S HOSPITAL BERTHA VAN HOOSEN and MAUDE HALL WIFTETT

Surrical cases complicating obstetrics CHICAGO LYING IN HOSPITAL

Friday Afternoon

FRED L Apara and staff Dry clinic Motion Dicture demonstration of episiotomy

COOK COUNTY HOSPITAL

CARRY CULBERTSON Operations

L RUDGLPH Symposium Prolonged labor, constriction ring dystocia

MERCY HOSPITAL

H E Schmitz and associates Symposium on operative gynecology

RESEARCH AND EDUCATIONAL HOSPITALS FREDERICF H FALLS and staff Symposium Gynecological

plastic operations with special reference to the use of incal anesthesia FREDERICK H FALLS Vaginal by sterectomy for proces dentia under local anesthesia

ORTHOPEDIC SURGERY

Monday Afternoon RESEARCH AND EDUCATIONAL HOSPITALS

H B THOMAS, F W HARL and C N LAMBERT Sym posium Tenodesis Operations and demonstration of cases, tendon transplantations

Tuesday Morning

CHILDREN'S MEMORIAL HOSPITAL

F CHA'DLER, F SEIDLER, C PEASE and J NORCROSS Operations and demonstration of cases

COLUMBUS HOSPITAL

E R. Storr and I E Storr Sciatics

COOK COUNTY HOSPITAL

ARTHUR COVLEY Operations and symposium with demon stration of cases, blind pegging of hip for fracture of neck of femur, using Kirschner wire and Smith Petersen nail, problems in diagnosis of bone tumors, painful back in medicolegal cases persistent dizziness following head

injuries, fractures in and about the ankle MARCUS H HOBART Operation Removal of internal semilunar cartuage Demonstration of cases Pecurrent dislocations of the shoulder, internal derangement of the knee joint, spinal fusions and low back pain, acquired dislocations of the hip following scarlet fever, syndacty lists

PRESBYTERIAN HOSPITAL

E J BERKHEISER Dry chair and demonstration of cases

MICHAEL REESE HOSPITAL

PHILIP LEWIN, DAVIEL LEVINTRAL, CHARLES PEASE F GLASSMAN, SIDNEY SIDEMAN, JEROME G FINDER and I WOLLN Operations

Tuesday Afternoon

MOUNT SINAI HOSPITAL

C Jacobs Orthopedic demonstrations L Miller. Visualization of joints

M J Summerville Anterior colporrhaphy and interposi-tion operation under local anesthesia WILLIAM H BROWNE Sturmdorf Kelly incontinence operation and perineorrhaphy under local anesthesis

WOMEN AND CHILDREN'S HOSPITAL

CATHERINE TRUE Abdominal gynecological cases FLOISE PARSONS Treatment of sterulty, treatment of eroded cervix by cautery, hipsodol visualization of uterus and tubes.

Days to be Announced

COOK COUNTY HOSPITAL

P GREENHILL, C W BARRETT, W T CARLISLE, ECON W FISCHMANN, FREDERICK H FALLS, A E KANTER and CAREY CULBERTSON Symposium on fibroids

HENROTIN HOSPITAL

EDNARD L CORNELL Operations and demonstration of CHANNENG W BARRETT and LEE STONE Operations and

demonstration of cases

J FINDER Giant cell tumor of bone F GLASSMAN Nonunion of neck of femus

WESLEY MEMORIAL HOSPITAL

F M JANSEY, H KELIKIAN and O H HORRALL Bone and joint surgers

Wednesday Morning

LUTHERAN DEACONESS HOSPITAL EMIL VETTAK. Indications for surgical treatment of arthritis

MUNICIPAL TUBERCULOSIS SANITARIUM

E J BERKHEISER Bone tuberculosis

ST BERNARD'S HOSPITAL

L B DOVELE and M E CREIGHTON Fractures of the shaft of the ferour

WESLEY MEMORIAL HOSPITAL

PERLIP H KREUSCHER and associates Bone and joint surgery, knee minnes

Wednesday Afternoon

EVANSTON HOSPITAL

I L PORTER and R C LOVERGAN LOW back disorders

MERCY HOSPITAL

J D CLARIDGE and associates Problems in orthopedic and traumatic surgery

PASSAVANT MEMORIAL HOSPITAL

EMIL HADSER and associates Surgery of the knee and foot-demonstration of cases and lantern slides Total tendon transplant for slipping patella, injuries of the external semilunar cartilage, loose body, the result of a semulunar cartilage injury, manipulative correction of deformity, tendon transplant as a routine procedure to triple arthrodesis of the paralytic foot, reconstruction operation for hallux valeus

PRESBYTERIAN HOSPITAL

J BERLHEISER RELLOGG SPEED and D RIDER Operations

MICHAFL REESE HOSPITAL Putter Lewis Fracture problems new approach for

arthrodesis of knee joint discussion of bone tumous motion picture demonstration of manipulative surgers Stovey Storius. Rice bodies in tendon shouth of the hand Hole stabilization of the foot spassic parallysis roentgenologic library of the hip joint fusion operation in tuberrulosis of the knee joint busings operation.

multiple cartilagurous erostosis

DANIELH LEVINTRAL and IRVING WOLE. Tendon trans
plantation in pollomyelitis spastic paralysis recurrent
dislocation of shoulder flat feet demonstration of
arthroplastics of the liner hip and eflow knee joint

surgery
CHARLES PEASE Acute transverse atrophy of hone
traumatic rupture of intervertebral disc reduction of
compression fracture of spine osteochondromatous of

the elbows

JEROME G. FYNDER Chondromyrosarcoma two cares flevorplasty of the thumb for paralytic opponens pollicis asterechondroma of the tibia. McEnide bumos plasty unusual bone tumor (?) of femor. Key operation for soft com-spastic paralysis—bulieteral adductor tentionny and obturator nerve neurectomy. Case with unusual deformations.

FRANK GLASMAN Fracture and dislocation of shoulder supracondylar fracture of the humerus fracture of the need of the femur complete fracture of the tubra and fibula removal of the bead of the radius three cases outcome of the femur demonstration of various types of fractures and treatment

ST ANTHONY DE PADUA HOSPITAL

THOMAS DWEER 'en bone biopsy trephine pathological specimens

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL Pretentation on Bone and Joint Surgery

E L Confess: Leg lengthening operation, technique and results spinal fusion in the correction of scobosis C H Harcher The pathology and treatment of tuber culous atthins studies in the rate of schedul growth

and equalization of limb length

H > HARKINS Bone graft operations for ununited

fracture
P C BLCy and R B CLOWARD Spinal extradural cyst

P C BLCY and R B CLOWARD Spinal extradural cyst and its relation to hyphosis dorsalis pressules

C B Hoscins Studies in the distribution of red bone marrow and the reticuloendothelial system in the skeleton

COOK COUNTY HOSPITAL

DANIEL H. LEVINYMAI. Rone graft surgers for nonumnistabilization and benign bone tumors. Motion partie demonstration. Surgeoil treatment of spastic pasalysis surgical treatment of residual paralysis following pobumyelitis.

Parity H. Rueuscher, Acola operation semiliarar car tilage derangement apinal grafts new operation for hip

tusion new operation for knee tusson
Prittir Lewis Tunnel skin graft over os calcis spondylolisthesis, stabilization of paralytic varus foot arthrodesis
of ankle joint ballitu varus tuberculous spine fusion
infantile paralysis low back pain eith scraftes

FRANK G. MCREHY. Skin grafts for old wounds of leg unusual bone turnors fracture into antile joint mal umon of Colles fracture tuberculous of tunesform bone scar contracture of forearm skin graft.

ILLINOIS MASONIC HOSPITAL

CHERES \ PEASE and EDGAR WHITE Tuberculosis of the knee fractures about the elbow in children reduction of fractures of the spine traumatic rupture of the inter-ertebral disc

MICHAEL REESF HOSPITAL

PHILIP LEWIN DANIEL LEVINITRAL CHARLES PRANE, F GLASSIVAN I WOLIN SIDNEY SIDEMAN and JEROME G FINDER Operations

ST BERNARD'S HOSPITAL

S L GOTTEN LE Pseudomuscular dystrophy case demonstration

J G FROST Metastatic hypernephroid carcinoma of the

R S Westerne and L L AREASDORF Fractures of the

ST MARY OF NAZARETH HOSPITAL

L Czaja Climic

VETERANS ADMINISTRATION FACILITY

S K Lavingszon Operations

Thursday Afternoon COOK COUNTY HOSPITAL

E J BERKETSER Operations and demonstration of cases
—spored/iolisthert, anterior poliomychits arthrodesis
and tendon transplantation

PRESBYTERIAN HOSPITAL E I BERRHEISER and D RIDER Operations

RESEARCH AND EDUCATIONAL HOSPITALS
II B TROMAS F W HARK and C N LAKERET Operation Shelving of congenital dislocation of patients with closed reduction open reduction
and shelving of congenital dislocation.

ST LUKE S HOSPITAL

F B Eversor and associates Demonstration of cases.

E II EVERSON and associates Demonstration of ease

LETERANS ADMINISTRATION FACILITY

S. K. LEVENGSTON, Symposium Bone tumors.

Friday Morning

LUTHERA' DEACONESS HOSPITAL

Essa brink Indications for surgical treatment of
gribinis

PRESBYTERIAN HOSPITAL

E J BERKHEISER KELLOGG SPEED and D RIDER Operations

ST BERNARD'S HOSPITAL
CHESTER C GUY Surgical pathology of bone tumors

VETERALS ADVINISTRATION FACILITY

S & Levenosco Symposium Maggot treatment of ostcomychias

GENITO-URINARY SURGERY

Monday Afternoon

COLUMBUS HOSPITAL

WILLIAM GIRL, FRANK L. CHENOWETH, H. E. DAVIS and I. F. VOLINI Resectoscope for bladder carcinoma

Tuesday Morning

MOUNT SINAL HOSPITAL

H POINTEL H SOLOWAY and E HIRSCH Symposium Tumors of the kidney

PASSAVANT MEMORIAL HOSPITAL

L. L. VESEE 1, V. L. LESPINASSE, HARRY CULVER and FRED LIEBERTHAL Sympolium Tuberculosis of the unnary tract

PRESBY TERIAN HOSPITAL HERMAN L KRETSCHMER, ROBERT HERBST and associates Operations

MICHAEL REESE HOSPITAL

KOLL, J LISENSTAEDT, H ROLNICK, I SHAPIRO, J GROVE, F LIEBERTHAL and A E JONES Symposium Carcinoma of the urivary bladder

ST JOSEPH'S HOSPITAL CHARLES M MICKEYNA. Undescended testicle

ST MARY OF NAZARETH HOSPITAL I WELFELD Urologic clinic Malignancy of tumors of the bladder in children

WESLEY MEMORIAL HOSPITAL V D LESPINASSE and associates Chipic

WOMEN AND CHILDREN'S HOSPITAL MARIE ORTHAYER and PEARL M STETLER Clinic

Tuesday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS C M Mckenna R D Herroup and staff Operations and demonstrations Experimental and clinical studies

on various types of unnary antiseptics, anomalies with special reference to undescended testicle and hypospadias ST ANTHONY DE PADUA HOSPITAL

O I JIRSA Prostatic management, carcinoma of bladder pyclography

II ednesday Morning

CHICAGO MEMORIAL HOSPITAL I WILLIAM PARKER and IOHN P O NEIL Operations

COOK COUNTY HOSPITAL

HARRY CULVER, L. L. VESEEY, CHARLES MCKEYNA and HARRY POLYTCK Operations

GARFIELD PARK HOSPITAL

VINCENT J O CONOR C C SAELHOF and associates More recent advances in infections in the urmany tract

MERCY HOSPITAL

If E Landes Symposium Transurethral resection
J E Laibe and associates Lidney anomalies treatment of neoplasms of the unnary tract

MUNICIPAL TUBERCULOSIS SANITARIUM DORREN RUDNICK Tuberculosis of the genito urmary tract

PRESBYTERIAN HOSPITAL

HERMAN L KRETSCHMER, ROBERT HERBST and associates Operations

MICHAEL REESE HOSPITAL

I KOLI, J EISENSTAEDT, H ROLNICK, I SHAPIRO, J GROVE, F LIEBERTH L and A E JONES Operations

WASHINGTON BOULEVARD HOSPITAL VINCENT J O CO'OR Dry clinic

Wednesday Afternoon

CHICAGO MEMORIAL HOSPITAL

J WILLIAM PARFER, JOHN P O'NEIL, E J STIEGLITZ, D G BREVIES, OTTO SAPEIR and GEORGE M LANDAU Symposium Kidney infections
M L Weinstern, J William Parker and John P

O'NEIL Transurethral resection of the prostate

R A MELEVOY, J WILLIAM PARKER, JOHN P O'NEIL and OTTO SAPHER Tuberculosis of the genito urinary tract in mates

EVANSTON HOSPITAL

I FARRELL Undescended testicles

ST ANNE'S HOSPITAL

HARRY I DOOLEY Urological clinic and demonstration of cases

ST BERNAPD'S HOSPITAL

AMBREW SULLIVAN Operations

ST LLIZABETH'S HOSPITAL I G McDongall Carrinoma of the bladder

Thursday Morning

CHILDREN'S MEMORIAL HOSPITAL

HERMAN L KREISCHMER and K BARBER Operations and demonstration of cases

COOK COUNTY HOSPITAL

HARRY CULVER and CHARLES MCKEYVA Symposium Chronic bladder neck obstruction in the male

HILINOIS MASONIC HOSPITAL

FOWARD W WHITE, ROBERT H HAVES and JOHN H GILMORE Renal tuberculosis Avenues of transmission, discussion of the pathogenesis and morbidity, primary for and complicating factors in relation to general tuberculosis, roentgenological aspects concerning prostatic resection

CLARENCE C SAELHOF and JOHN H GILMORE Carcinoma of bladder-diagnosis, type of treatment and approach, result and cases renal calcult-multiple stone in redup's cated pelvis, diagnosis, treatment by heminephrectomy, operative cases malignancy of prostate gland—diagno sis, method of immediate relief for obstructive symptoms, postoperative radiation therapy and results, cases, roentgenological advances in urologic diagnosis Operations

JACKSON PARK HOSPITAL WILLIAM LONKER. Transprethral prostate resection compared to other types of prostatic surgery

PRESBYTERIAN HOSPITAL HERMA' L KRETSCHWER ROBERT HERBST and a sociates.

MICHAEL REESE HOSPITAL I KOLL J EISENSTAEDT H. ROLNICK I SHAFTRO J GROVE, F LIEBERTH & and A. E. JOVES. Operations.

ST JOSEPH S HOSPITAL CHARLES 31 McKenna. Undescended testicle

ST LUKES HOSPITAL L W Schutzt and associates. Dry clinic,

VETERANS ADMINISTRATION FACILITY T & McDorgath, Carcinoma of the bladder

WESLEY MEMORIAL HOSPITAL V D LESPINASSE and associates Clinic

Friday Mori ing EVANGELICAL DEACONESS HOSPITAL PACE MORY Sephrolithotomy

ILLINOIS MASONIC HOSPITAL

C. One River. \ephrectomy transmethral processes insection unalogical clinic. Anomalies of upper unuary tract, bilateral and unilateral complete reduplication of kidness and areters, incomplete reduplication of hidness and ureters, bind pelves, ureteral bud. renal tuberculosis.

PRESBYTERIAN HONPITAL HERMAN L. KRETSCHWER ROBERT HERRST and associates. Dry clanc

VETERANS ADMINISTRATION FACILITY

T G McDorgani, Penneal prostatectory Days to be Aprounced

COOK COUNTY HOSPITAL L. L. LESEEN and HARRY ROLLICK. Symposium Pyogenic selections of the upper unnary tract.

HENROTTN HOSPITAL DORRIN RUDNICK, Kidney complications in women.

FRACTURES AND TRAUMATIC SURGERY

Monday liternoon COOK COLVEY HOSPITAL WILLIAM R CUBBINS and associates Operative fractures. JACKSON PARK HOSPITAL

S W M ROBINSON C W HENNES and M J Miles Traumatic surgery

ST ANTHONY DE PADLA HOSPITAL F W SLOBE Fractures special phases of traumatic our

Tuesday Morning

CHICAGO MEMORIAL HOSPITAL ARTRUR H CONES and S Pears Rogers Symposium Blind pegging of fractures of the femur
FRED MILLER T C BROWNING Earth DUNAL and
GRONGE M LANDAU Fracture of both bones of lower leg COOK COUNTY HOSPITAL

Withham R. Curries and a sociates. Ward walk.

ST JOSEPH'S HOSPITAL

HIGH McKENNA Demonstration clima

WASHINGTON BOTTLENARD HOSPITAL ARTHUR R. METZ General urgery and fractures

Tuesday Afternoon CHICAGO MEMORIAL HOSPITAL

C R. G FORRESTER, HORACE SITUSON and A. H. MASON Symposium Fractures nerve repair COOF COUNTS HOSPITAL

STIENER L Koch and associate Tendon and nerve suturing of the hand hand infections.

VETERANS ADMINISTRATION FACILITY S K LIVINGSTON Dry chinic.

Hednesday Morrine COOK COUNTY HOSPITAL WHILLIAM R. CTEED'S and associates. Ward walk. FREDERICK DYAS. Ward walk (female)

EVANSTON HOSPITAL Dutcer Clark Fractures about the knee somt.

ST ANNES HOSPITAL TROMAS E. Myany Fractures and tendon transplants

tions. ST BERNARDS HOSPITAL

L. B. Dovkle and M. E. Crezcerrov. Fractures of the halt of the lemur

> Il ednesday Afterroon COOK COUNTS HOSPITAL

WILLIAM R. CLEEDS JAMES J CALLAHAN CARLO S. SCIDERL FREDERICE DIAS and GEORGE L. APPLIBACE. Symposium Kree joint injunes.

PASSAVANT MEMORIAL HOSPITAL PARTE B. MAGNESON and JAMES L. STACK, Symposium on factores.

> Thursday Morning COOK COUNTY HOSPITAL

HIRETER R. CERRINS and a sociates. Ward walk. GARRIELD PARK HOSPITAL

J CALLARAN H. NATT and MILTON SCENITT Dem on tration climic

JACKSON PARK HOSPITAL ARRIE BAMBERGER, Demonstration clinic.

ST BERNARD'S HOSPITAL

R. S. WESTLINE and E. L. ARENSDORF Fractures of the wrist toint.

ST JOSEPH'S HOSPITAL HUGH McKenya Demonstration clinic

ST MARY OF NAZARETH HOSPITAL L CZAJA Symposium Late results of fractures

II S MARINE HOSPITAL

HORACE P STIMSON Ununited fractures with osteo my clitis E C Lurroy and R W FLY's Skeletal truction and

countertraction in treatment of fractures FRANCES E WILLARD HOSPITAL TAMES A VALENTINE Clinic

Thursday Afternoon

CHICAGO MEMORIAL HOSPITAL ARTHUR H CONLEY and S PERPY ROGEPS Blind pegging of fractures of the femur FRED MILIFR, T C BROWNING, EMILE DULAL and GEORGE M LANDAU Fracture of both bones of the

lower leg COOK COUNTY HOSPITAL

WILLIAM R. CUBBINS and associates Operative fractures Gronge L Appelbach Ward walk (female)

JACKSON PAPK HOSPITAL S W M ROBINSON, C W HENNAN and M J MILLS Traumatic surgery

FRANCES E WILLARD HOSPITAL FRED CARLS Clinic

WOMEY AND CHILDREN'S HOSPITAL ARMINA HILL Minor injunes

MARY E WHITAMS Fractures, dislocations Friday Morning

CHICAGO MEMORIAL HOSPITAL C R G FORRESTER, HORACE STIMSON and A H MASON Fractures nerve repair

COOK COUNTY HOSPITAL WITHTAN R CENTINS and associates Follow up clinic. demonstration of cases

> Friday Afternoon COLUMBUS HOSPITAL

I MUELLER Fractures W I BEECHER Traumatic surgery COOK COUNTY HOSPITAL

JAMES I CALLAHAN and CARLO S SCUDERI Cadaver demonstrations

Days to be 11 nounced COOK COUNTY HOSPITAL

Dg Garewood Symposium Fractures in children HENROTIN HOSPITAL ARTHUR R COVLEY Demonstration clinic

PLASTIC AND FACIOMAXILLARY SURGERY

Monday Afterroom

ILLINOIS EYE AND EAR INFIRMANA SAMUEL SALINGER Plastic surgery of the nose SIDVEN POLLACE Nasal fractures BERNARD M COMEN Nasal and ear prostheles

Tuesday Mornine

CHICAGO MEMORIAL HOSPITAL CASPER M EPSTEIN Symposium Plastic, including facio maxillary surgery

COOK COUNTY HOSPITAL

JOSEPH E SCHAEFER Demonstration of cases showing corrected temporomandibular ankylosis harelips and cleft palates pedicle flap and full thickness graft cases, repair of burns, traumatic injuries, plastic repairs of con trolled carcinoma cases

ST JOSEPH'S HOSPITAL WILLIAM H. G LOGAN Oral surgery

> Tuesday Afternoon PRESBYTERIAN HOSPITAL

FREDERICK MOOREHEAD and R OLUSTED Operations

MICHAEL REESE HOSPITAL

SAMUEL SALINGER and CASPER EPSTEIN Nasal and facial plastic surgery, treatment of injuries to the face

II ednesday Afternoon MOUNT SINAI HOSPITAL E Arson and associates Oral surgery

PRESBYTERIAN HOSPITAL

FREDERICA MODESTEAD and R OLESTED Operations Thursday Morning

COOK COUNTY HOSPITAL JOSEPH E SCHAEFER Demonstration of cases showing car cinoma of mouth, hips and face, with colored photographs

of lessons before and after radiation MICHAEL REESE HOSPITAL

CASPER EPSTERY Oral surgery ST JOSEPH'S HOSPITAL WILLIAM H G LOGAS Gral surgers

> Thursday Afternoon PRESBYTERIAN HOSPITAL

FREDERICK MOOREHEAD and R OLMSTED Dry clinic

Friday Afternoon

CHILDREN'S MEMORIAL HOSPITAL L W SCHULTZ Dry clinic and demonstration

PRESBYTERIAN HOSPITAL FREDERICK MOOREHEAD and R OLUSTED Operations

RESEARCH AND EDUCATIONAL HOSPITALS L W SCHULTZ Oral surgery with particular reference to cleft palates and harelips

Day to be Announced COOK COUNTY HOSPITAL I Musear Plastic surgery of the nose and face

NEUROSURGERY

Monday Afternoon

COOK COUNTY HO-PITAL

H. C. Voris and J. J. Krarns. Intracramal injury—dem-on_tration of pathology physiology in_negrenat, currecal interference, sequela complications.

Tuesday Morning

RESEARCH AND EDUCATIONAL HOSPITALS

GEZA DETAEATS Operation Lumber sympathectomy Symposium Neurocurculatory Diseases R BETWEE The use of neosynephrine in spinal anes-

WILLIAM C. BLOK. Selection of cases for everpath-closely demon tration of sympathectom and patients evalua tion of results the management of lymphederes. F K Hick. Vascular accidents a sociated with coronary

H C LUCIEL Unusual reactions following the use of mitrorily cenne

GEZA DETAKATS The treatment of acute arteral occluion operability of hyperten, on denoral tration of cases.

H. L. Missers and P. J. Sarwa. The treatment of vari

cos veins and ulcers.
T Revolus Amputations in peripheral vascular disease

Tuerday Afternoon

MEPCI HOSPITAL C F Scrays and H. C Voais, Neuro-ophthalmology Preventation of cases with fundy permettic feld find are disculting of diagnostic problem, presentation and dis-cultion of cases of recurrent populations following on

PRESBYTERIAN HOSPITAL

nual explorations and decompres 1005 A VERENCOREN Dry clinic and demonstration

Hednesday Morning

RESEARCH AND EDUCATIONAL HOSPITALS FRIC OLDEREG Operations and demon-tration of cases.

Il edne day Afternoor COOK COUNTY HOSPITAL

A Venezu coma Surgical parap ega-eti ngi path » gr di caton, phreol or transat proposes. PRESBYTERIAN HOSPITAL

4. VERREIGGERS Operaum.

Thurday Merrire

ALBERT MERRITT BILLINGS HOSPITAL P C Brest and R. B Crowsen Spanil extradural cyst and a s relation to hyphose dorsals inventes.

RESEAPCH AND EDUCATIONAL HOSPITALS Exte Outgoing Operatories and demonstration of cases.

That day Afterroom MERCA HOSPITAL

H.C Vorts and a sorates Symposium Management of בביעלק (בילורים

H. C Vers and H. E. Larres. Demonstrat, a cichered p'er_ recetion in bydrocephalus extenseine studies in prerulement lesses

C F Scients and H C Volum Neuro-ophthalm by Presentation of cases with funds, primeting field find tops discussion of diamosts, problem, presentation and disce on of cases of recurrent pay widers following crasual employations and decompressions.

PRESBYTERIAN HOSPITAL

A VERRETGEREN OPERE E.

MICHAEL REESE HOSPITAL Symposium Intracranal Scriptization.
Por Garnetta Neur operal aspects of intracranal sup-

A VEREITGEREN Surpula pects of trum aborn.

Friday Afterroon

PASSAVANT MEMORIAL HOSPITAL LOTAL DAVIS and JOHN MARTIN VERT VESTAL SERVICE Presention emphasing degroes and treatment PRESBITERIAN HOSPITAL

A VERREUGGEEN OPERANTAL

THORACIC SURGERY

Monday Afternoon ST LUKE S HOSPITAL WILLARD VAN HAZEL Demon tration clinic PAUL H. HOLLINGER, Surgery of bronchin.

Tuesday Morring

COLUMBUS HOSPITAL

R. M DAVISON C VOLINI, M JOANNIDES, D ORIH and G MUZILER. Symposium in tuberculous. Thursus surgery pneumothorax treatment suchding climatotherapy

COOK COUNTS HOSPITAL

JOHN B O'DONOGHUE and POSERT LEE. Trestment of empyema ward walk and presentation of cases.

RESEARCH AND EDUCATIONAL HOSPITALS WHELED VAN HAZEL Operations with demonstration of Career.

ST TOSEPH'S HOSPITAL HILLIAN C. BELL. Thoraca. Calgary

VETERANS ADMINISTRATION FACILITY IEROKE R. HEAD New type of thorscopiesty-ches' surgery

Tue-day Afterroom

COOK COUNTY HOSPITAL

RALPH B BETTEAN Operations. PRESBYTERIAN HOSPITAL

Ions Donery Dry class and deprestrative

RESEARCH AND EDUCATIONAL HOSPITALS
WILLARD VAN HAZEL and staff Symposium Broncho

genic cartinoma
S Levinsov Pathology
Adolph Haptul G Roentgenological diagnosis
Paul H Holinger Bronchogenic aspects

WILLARD VAR HAZEL Surgical consideration, demonstration of cases and specimens, surgical treatment of mediastinal tumors

T J Wacnowski Roentgenological consideration of mediastinal tumors

mediastinal tumors
M JOANNIDES Collapse therapy of pulmonary tubercu

Wednesday Morning EVANSTON HOSPITAL

JEROME R HEAD Indications for lobectoms

MUNICIPAL TUBERCULOSIS SANITARIUM
RICHARD DAVISON Thoracoplasty

ST BERNARD'S HOSPIT'IL

R J DREVER The rational treatment of emplema, dem onstration of cases
S L Governage and I I Flore Congenital cyst of the

lung, demonstration of cases

Wednesday Afternoon

MUNICIPAL TUBERCULOSIS SANITARIUM

M JOANNIDES Phrenic surgery, intrapleural pneumolysis

PRESBYTERIAN HOSPITAL
JOHN DORSEY Operations

Thursday Morning
ILLINOIS MASONIC HOSPITAL

MINAS JOANNINES Phrenic neurectomy, phrenic crush, scalenotomy, artificial pneumoperitoneum, eleothorax Dry Jhnic Dieothorax Indications, technique and complications, advantages of artificial pneumoperitoneum as an adjunct to phretic neuretotomy

MUNICIPAL TUBERCULOSIS SANITARIUM RICHARD DAVISON Thortcoplasty, pneumolysis ST JOSEPH'S HOSPITAL

WILLIAM C BECK. Thoracic surgery

Thursday Afternoon
COOK COUNTY HOSPITAL

RALPH B BETTMAN Operations

PRESBITERIAN HOSPITAL JOHN DORSEN Opera' cos

MICHAEL REESE HOSPITAL

RALPH B BETTH IN and WILLIAU TANNEYBAUM Thoracic surgers

ST PERNARD'S HOSPITAL

A H MONTGOMERY and R L CUMMINGS Pericarditis with effusion, demonstration of case

Friday Morning
MICHAEL REESE HOSPITAL

RAIFIE B BETTMAN and WILLIAM TANNEYBAUM Thor acoplasty operation

Max Bresential Surgery of pulmonary tuberculosis
Max Bresential and Raiph B Bettiann Technique of
various operations used for pulmonary tuberculosis
Artificial pneumothorax, pneumolysis, thoracoplast),

motion picture and diagrammatic demonstrations
RAIFR B BETTYAN Treatment of empyema, injuries of
the chest, presentation of cases, motion picture and

diagrammatic demonstrations

WOMEN AND CHILDREN'S HOSPITAL

Heldn Handen, Chelia Girsotas, Margaret Austiand Nora B Brandenburg Bronchoscopy in relation to asthms and allied pulmonary conditions, lipicodol in juction

Friday Afternoon COOK COUNTY HOSPITAL

John B O'Dondghue, Frederick Tice, Richard Jaffe, M J Hubenn, S H Rosenburg and A J Heuby Symposium Pulmonary tubertulosis John B O'Dondghue Operations

Presbyterian hospital

John Dorsey Operations

TUMORS AND IRRADIATION

Monday Afternoon

ST ELIZABETH'S HOSPITAL

I BRANS Radium treatment of fractures

VETERANS ADMINISTRATION FACILITY

G R ALLABEV Regular tumor chinic

Tuesday Morning

LUTHLRAN DEACONESS HOSPITAL

Isonore Prior Pathology of malignant growths in relation to therapeutic indications

MICHAEL REESE HOSPITAL

Max Cutler Jero is F Strauss and Savuel Pearl Man Radium theraps in malignant tumors of the brad and neck, demonstration of cases and technique

ST ELIZABETH'S HOSPITAL
M G LUKEN Sarcoma of the stomach

VETERANS ADMINISTRATION FACILITY
A E WILLIAMS Deep x ray and radium therapy

Tuesday Afternoon

RAVENSWOOD HOSPITAL

C Buswell, J J Moore, H P Saunvers and L E Schaffer Cancer clinic presentation of specimens lantern slides, cases illustrating melanomies of shoulder and rive

PESEARCH AND EDUCATIONAL HOSPITALS WILLARD VAN HAZEL and staff Symposium Broncho

genic carcinoma
S Levinsos Pathology
Adolen Harris C Roentgenological diagnosis

PALL H HOLINGER Bronchogenic aspects
WILLARD VA's HAZEL Surgical consideration, demonstration of cases and specimens, surgical treatment of
mediastim's tumors

M JOANNIDES Collapse therapy of pulmonary tubercu

T J WACHOWSKI Roentgenological consideration of medi astinal tumors

II ednesday Morning ALBERT MERRITT BILLINGS HOSPITAL

Presentation on Tumor Surrery A BRUNSCHWIG Experimental production of tumors and the efficacy of Coley's toxin in the treatment of experi mental sarcoma palhative treatment of pulmonary metasta es from malignant tumnrs late results in treat ment of benign giant cell tumors of bone

D B PHEMISTER and associates Studies in the etiology, diagnosis and treatment of bone tumors

HARWELL WILSON Extraskeletal ossufying tumora. VETERANS ADVINISTRATION FACILITY

MAX CUTLER Annual tumor clinic Presentation of cancer cases indications technique and results of radium therapy

G R ALLAREN Diagnosis and treatment.

Thursday Morning

COLUMBUS HOSPITAL D A ORTH M HANNAN and H P DAVIS Symposium Breast cancer

LUTHERAN DEACONESS HOSPIT &L

ISADORE PILOT Pathology of malignant growths in rela tion to therapeutic indications

MERCY HOSPITAL

W J Pickerr Unusual cases of malignancy

MICHAEL REESE HOSPITAL

MAX CUTLER and staff Results of radiation treatment of cancer of mouth tonal pharynx and larynx, presents tion of cases Radiation treatment of cancer of the breast presentation of cases Motion pictures illustrating the technique of radium treatment of cancer of the mouth and cancer of the cervix Transiliumination of the breast.

ST ELIZABETH'S HOSPITAL

LEO M ZIMMERMAN Mediastinal tumors VETERANS ADMINISTRATION FACILITY

A E WILLIAMS Inspection of deep x ray and radium therapy unit

WESLEY MEMORIAL HOSPITAL GUYS VAN ALSTYNE. Carcinoma of the breast, combined surgical and a ray treatment.

Thursday Afternoon PASSALANT MEMORIAL HOSPITAL

MAX CUTLES. The organization of a tumor clinic Per sonnel equipment records follow up Carcinoma of the Breast

JOHN A WOLFER, Surgical considerations. JAMES T Case Pre and postoperative x ray radiation L M ROSENTRAL. Radium treatment. MAJOR GREENE Bronchiogenic tumors of the neck JOHN F DELPH and EARL BARTH Cammoma of the

laryng hypopharyng and tonsil. JOHN MOHARDY A survey of some proposed cancer cures Friday Morning

MERCY HOSPITAL HENRY L SCHLIFFZ and associates Symposium Radi elegic therapy of malignancy

RESEARCH AND EDUCATIONAL HOSPITALS R B MALCOLN, Operations Neck dissection carcinoma of breast surgical pathology of breast tumors.

T J WACHOWSEL X rsy treatment of carcinoma of breast
ARRIE BAMPERCER Ewing tumor with case report.

ST BERNARD'S HOSPITAL

CHESTER C GUY Surgical pathology of bone tumors ST LUKES HOSPITAL H. E. Mock and associates Tumor clinic. VETERANS ADMINISTRATION FACILITY

G R. ALLASEN Regular tumor clime WESLEY MEMORIAL HOSPITAL

Earl LATIVER. Unusual breast tumors.

Friday Afternoon PRESBYTERIAN HOSPITAL CARL APPELBACK and F SOUTEE Dry chine

> Day to be Announced HENROTIN HOSPITAL

Samuel Levinson Surgical pathology

ROENTGENOLOGY

Tuesday Morning LUTHERAN DEACONESS HOSPITAL RAYPH WILLY Newer concepts in the treatment of car cinoma

ST MARY OF NAZARETH HOSPITAL C. I. CHALLENGER 'A ray studies of surgical conditions

> Tuesday Afternoon ST ANTHON'S DE PADUA HOSPITAL

I. S. Tichry Silicosis demonstration ST BERNARDS HOSPITAL

B C CUSHWAY R. J MAIER and E K LEWIS Roentgen therapy of inflammation and infections of the face and neck

ST LUKE'S HOSPITAL STATE Y ray diagnosis.

Wednesday Afternoon

AUGUSTANA HOSPITAL

DAVID S BEILEY Roentgen diagno is nf gastro-intestinal lesions ALBERT MERRITT BILLINGS HOSPITAL

PAUL C HODGES and associates V ray diagnosis

Thursday Morning LUTHERAN DEACONESS HOSPITAL

RAIPH WILLY Newer concepts in the treatment of car canoma

RESEARCH AND EDUCATIONAL HOSPITALS ADOLPH HARTUNG Conference on x ray diagnosis, with particular reference to bone dystrophy, leaons of the unnary tract brain tumors and unusual lesions of the gastro intestinal tract

Thursday Afternoon

COOK COUNTY HOSPITAL

ROBERT F McNattiv High voltage therapy of malig nancies

M J Hungwy Roentgenological examination of appendix

MOUNT SINAI HOSPITAL MAX COHN, G DANELIUS and E LEWIN Demonstrations of interesting radiologicosurgical conditions

ST LUKE'S HOSPITAL

STARY X ray diagnosis

PHYSICAL THERAPY

Monday Afternoon

COOK COUNTY HOSPITAL

DISRAELI KOBAK Discussion of general physical therapy procedures

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL Join S Coulter and S L Conorne Clinical and experi mental tavestigations of short wave medical diathermy

MICHAEL REESE HOSPITAL

C O Molander Ward walks, physiotherapy methods

Tuesday Morning COOK COUNTY HOSPITAL

DISRAELI KOBAK Physical therapy in posttraumatic con ditions

MUNICIPAL TUBERCULOSIS SANITARIUM JOHN S COULTER and LEO HARDT Ultra-solet radiation in the treatment of gastro intestinal tuberculosis

Tuesday Afternoon

COOK COUNTY HOSPITAL 1 I F HURWOY Physical therapy in infantile paralysis

MICHAEL REESE HOSPITAL

S PERIOW and C O MOLANDER Physical therapy in the treatment of circulatory disturbances

ST LUKE'S HOSPITAL

GEZA DETAKATS and JOHN S COULTER Physical agents in the treatment of peripheral circulatory diseases Con stant temperature cradle, suction pressuce apparatus intermittent venous hyperemia, oscillating bed, metholyl iontophoresi.

Wednesday Morning

COOK COUNTY HOSPITAL

DISRAELI KOBAR Physical therapy in postoperative and traumatic infections

GARFIELD PARK HOSPITAL MILTON SCHUITT Hyperpyrexia in gonorrheal arthritis

Friday Afternoon AUGUSTANA HOSPITAL

DAVID'S BELLEY Poentgen diagnosis of lesions of urinary tract COOK COUNTY HOSPITAL

I PAUL BENNETT Roentgenological examination of the kidneys ureters and bladder ROBERT F McNattin High voltage therapy of malig

mancies Days to be Announced HENROTIN HOSPITAL

ARTHUR R HANSEN X ray demonstration

WESLEY MEMORIAL HOSPITAL

FRANK L HUSSEY The interpretation of x ray findings in obscure easing and duodenal lesions, the use of x ray in consunction with surgery of the large bowel

NORTHWESTERN UNIVERSITY MEDICAL

SCHOOL HERMAN CHOR Rationale of physical therapy in muscle

disorders JOHN S COULTER Demonstration of clinical and experi mental results

MICHAEL REESE HOSPITAL FRANK GLASSMAN and C O MOLANDER Physical therapy in the treatment of fractures

Wednesday Afternoon

COOK COUNTY HOSPITAL

I F Humatov Physical therapy in neurosurgical and neurological conditions

GARFIELD PARK COMMUNITY HOSPITAL

MILTON G SCHUTT The value of heating tissues by in duction, hyperpyrexia

PASSAVANT MEMORIAL HOSPITAL

J S COULTER Physical therapy in fractures SUMMER L KOCH, MICHAEL L MASON and J S COULTER Physical therapy in hand mouries

MICHAEL REESE HOSPITAL

I WOLIN and C O MOLANDER Physical therapy in the treatment of poliomychitis
Sidney Sideman and C.O. Molayder Physical therapy in

treatment of spastics

Thursday Morning

COOK COUNTY HOSPITAL

DISRAELI KOBAK Physical therapy in low back conditions ILLINOIS CENTRAL HOSPITAL

IONN S COULTER Under water exercises in the treatment of fractures of weight bearing bones

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J S COULTER and S L OSBORNE Hyperpyrexia in chronic infectious arthritis

F CHANDLER, J R NOECROSS and J S COULTER Man agement of low back conditions

MICHAEL REESE HOSPITAL

BERT FINNE Hyperpyrexia in the treatment of genoriheal arthritis

Thursday Afternoon
COOK COUNTY HOSPITAL

I F HUMMON Manipulative treatment in low back conditions
NORTHWESTERN UNIVERSITY MEDICAL

NORTHWESTERN UNIVERSITY MEDICAL
SCHOOL
EMIL HAUSER and I S Coulter The role of physical

therapy in common disorders of the foot MICHAEL REESE HOSPITAL

Julius Grinker and C. O. Molander. Physical therapy in treatment of peripheral nerve injuries.

Friday Morning

NORTHWESTERN UNIVERSITY MEDICAL

SC HOOL

LEON ARIEA Acceleration of bone growth and repair as determined by deposition of dye in the callus (By

feeding dogs dyes which are deposited in the callus

experimental fractures are studied to determine what

substances accelerate bone growth and repair) Lantern

of the stomach in calcification of bone (Demonstration

of gastrectomized puppies showing homogenous osteo-

porosis This demonstration shows the necessity of ob-

servance of dietary care in gastrectomized patients)

ELMER J ROCLE The effect of various foods upon bile

C R SCHMIDT and J M BEAZELL The effect of diet on pancreatic secretion (The results obtained guide the postoperative care of a patient with duodenal fistula)

WILLIAM BACHRACH and SAMUEL J FOGEISON Common duct transplantation (Demonstration of animal Results obtained show the site of implantation of the com

mon duct is important in preventing subsequent ascend

studies on tendon repair (Histologic studies of tendon

secretion with and without return of bile to the gastro

intestinal tract (Demonstration of animals This shows the necessity of adequate dietary control of patients with

R A BUSSABARGER S FREEMAN and A C IVY The role

Friday Morning
COOK COUNTY HOSPITAL
DISRAELI KOBAK Physical therapy in hursitis

slide demonstration

biliary fistulas)

Lantern slide demonstration

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J 5 COULTER Physical therapy in traumatic arthritis

MICHAEL REESE HOSPITAL

LESTER FRANKENTHAL and C O MOLANDER Physical therapy in treatment of thronic pelvic inflammation

Friday Afternoon

COOK COUNTY HOSPITAL

HUMMON Physical therapy in the presention of

ST LUKE 5 HOSPITAL

H E MOCK and JOHN S COULTER Reconstructive cases in physical therapy

EXPERIMENTAL SURGERY

deformities

repair after use of varied suture material grafts and different techniques)

LEO M ZIMMERMAN Surgical repair of inguinal hernia as guided by anatomical studies (A simplification of surgical technique for the treatment of inguinal hernia after evaluating the anatomy)

JOHN MARTIN The negative effects of midbrain le ions upon the gastre secretion modifity and gastre intestinal ulceration in monkeys and cats. A Hoyeley Clarke apparatus was used to produce middrain leainns in cats and monkeys. No changes were observed in gastro intestinal function and activity.

HOS of the rational of physical therapy in the treatment of muscle disorders. Experimental observations on massage passive movement of electrical stimulation and rest upon muscle atmphy and regeneration in the lower motor neuron type of paralysis.

MICHAEL REESE HOSPITAL

STAFF Demonstration in experimental surgery

Days to be Announced

LABORATORY STATE Demonstration in experimental sur-

RESEARCH AND EDUCATIONAL HOSPITALS
WARREN H Code and associates Period of experimental
surgery

OPHTHALMOLOGY

Monday Afternoon
ALBERT MERRITT BILLINGS HOSPITAL
A C KRAUSE Fundus diagnosis

CHILDREN'S MEMORIAL HOSPITAL
G GUIBOR Orthoptics

COOK COUNTY HOSPITAL

F. B. FOWLER Fundus diagnostic clinic

ing infections of the biliary passages)

WEIGHT L. MASON and HARVEY S. ALLEY Experimental

ILLINOIS EXE AND EAR INFIRMARY
R VON DER HEYDT Operation for glaucoma and estaract
DWIGHT C ORCLIT Dry clinic

MERCY HOSPITAL

C F SCHAUB F I BARNETT and E A ROLING Fundus clinic

MICHAEL REESE HOSPITAL
PHILIP HALFER Orthoptics

RUSH MEDICAL COLLEGE

DR HOLMES Orthoptics

Tuesday Morning

NORTHWESTERN UNIVERSITY MEDICAL

SCHOOL George Guinor Orthoptic training, classification of squint

SANFORD R GEFORD Concomitant and maraly tic squint RUSH MEDICAL COLLEGE

DR WILBER Histopathology

Tuesday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL C V DEVNEY Orthoptics

COLUMBUS HOSPITAL

M GOLDENBURG Eye chaic

COOK COUNTY HOSPITAL C I LERGER Medical ophthalmology

ILLINOIS EYE AND EAR INFIRMARY THOMAS D ALLEN Operation for glaucoma and cataract Louis Horran and E K Findlay Dry clinics

MERCY HOSPITAL

C F Schara and H C Voris Neuro ophthalmology Presentation of cases with funds perimetric field find ings, discussion of diagnostic problems presentation and di cussion of cases of recurrent papilledema following cranial explorations and decompressions

MOUNT SINAI HOSPITAL

I LEBENSOHN and E SELINGER Clinic

MICHAEL REESE HOSPITAL T M SHADURA Frondus climic

RUSH MEDICAL COLLEGE Dr. Iscorsos, Fundus clinic

ST LUKES HOSPITAL

P A VORISEK Clipical cases

Il ednesday Morning COOK COUNTY HOSPITAL

SANFORD R. GIRRORD. Returnal detachment

RUSH MEDICAL COLLEGE W F MONCREUPF Cataract

Wednesday Asternoon

ALBERT MERRITT BILLINGS HOSPITAL 5 5 BLANKSTEIN End results of retinal detachment operations

CHILDREN'S MEMORIAL HOSPITAL R C GAMBLE and E A VORISCK Diagnostic clinic

ILLINOIS EYE AND DAR INFIRMARY DWIGHT C ORCUTT Operation for glaucoma and cataract 5 J MEYER Retinal detachment k H CHAPMAN Orthoptics

MERCY HOSPITAL

C F SCRAUB, F I BARNETT and E A ROLING Fundus chaic

MICHALL REESE HOSPITAL S J MEYER and D SNYDACKER Retinal detachment

ST LUKE'S HOSPITAL

I WALSH Clinical cases

I S MARINE HOSPITAL ALFRED N MURRAY Eve muries

Thursday Morning

ILLINOIS MASONIC HOSPITAL ALVA Sowers Cataract extraction employing Elschnig technique, discussion of dinitrophenol cataracts-treat ment results

Thursday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

L BOTHMAN Macular disease COLUMBUS HOSPITAL

M GOLDENBURG Lye clinic

COOK COUNTY HOSPITAL

C B FOWLER Fundus clinic ILLINOIS EYE AND EAR INFIRMARY

E & FINDLAY and Louis Hoffman Operation for claucoma and cataract THOMAS D ALLEN Glaucoma

MERCY HOSPITAL

C F Schaub and H C Vorts Neuro ophthalmology Presentation of cases with funds, permetric feld find-ings diagnostic problems presentation and discussion of cases of recurrent papilledems following cramal explorations and decompressions

MICHAEL REESE HOSPITAL

IACL COWAN Glaucoma clinic

ST LUKE'S HOSPITAL

FRANK C BRANCEY and J W CLARK Chincal cases

Iriday Afternoon ALBERT MERRITT BILLINGS HOSPITAL

DR McSHELLHAN Cataract results CHILDREN'S MLMORIAL HOSPITAL

R O RISER Diagnostic clinic

ILLINOIS ELL AND EAR INFIRMARY S J MEYER Operation for glaucoma and cataract R VOYDER HEYDT Shit lamp demonstration

RUSH MEDICAL COLLEGE

E SELFYGER Medical ophthalmology

ST LUKE'S HOSPITAL R C GAMBLE Chinical cases

Days to be Innounced

COLUMBUS HOSPITAL

M GOLDENBURG Glaucoma chinic

HENROTIN HOSPITAL GEORGE W MAHONEY, E A ROLING and IRVING BAR

NETT Eye clinic

OTOLARYNGOLOGY

.

Monday Afternoon
ILLINOIS EVE AND EAR INFIRMARY

SAMUEL SALINGER SIDNEY POLLACE and BERNARD M
Conen Plastic surgery of the nose masal fractures,
masal and ear prostheses

RESEARCH AND EDUCATIONAL HOSPITALS
OLIVER E VAN ALYEA Surgical anatomy of the nasal

MANUEL G SPIESMAN Diseases of the pharynx
Sylvio A Sciaretta Conservative treatment of chronic
suppurative of this media

RUSH MEDICAL COLLEGE LOUIS T CURRY and FRANK WOINIAK, Sulfamilamide in

the treatment of meningitis

Tuesday Morning

MOUNT SINAI HOSPITAL

JOSEPH C BLCR ALFRED LEWY JACOB LIPSCHUTZ S VI MORWITZ, FRANCIS L LEDERER M R GUTTHAN and associates Cluics

MICHAEL REESE HOSPITAL

Max Cutler Jerome C Strauss and Samuel Pearl
Man Radium therapy in mangrant tumors of the head
and neck demonstration of cases and technique

ST JOSEPH 5 HOSPITAL

AUSTIN A HAVDEY Conservation of hearing, mastoid and

Sinus surgery

Tuesday Afternoon

MICHAEL REESE HOSPITAL
SANUEL SALINGER and CASPER ERSTEIN Dasal and facial

plastic surgery treatment of injuries to the face RESEARCH AND EDUCATIONAL HOSPITALS

FRANCIS LEDERER Ear nose and throat plastic surgery
PAUL H HOLINGER Diseases of the larynx
RUSH MEDICAL COLLEGE

EIMER HAGENS and PAUL CAMPBELL Pathology of the

petrous bone in cases dying of meningitis lantern slides.

ST MARY OF NAZARETH HOSPITAL

J J KILLEEN Mastorditis in children

Wednesday Worning
MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIPSCHUTZ S M MORWITZ FRANCIS LEDERER M R GUTTMAN and associates Clinics

ST ELIZABETH S HOSPITAL

F A DULAE Ozena

Wednesday Afternoon
RESEARCH AND EDUCATIONAL HOSPITALS
J THEOBALD Complications of middle car infections
SHERMAN L SHAPIRO Neuro-otology

SHERMAN L SHAPIRO Neuro-otology DR PELOUZE Deep neck infections

RUSH MEDICAL COLLEGE

THOMAS W LEWIS and RICHARD WATKINS Causative factors and results of treatment of vasomotor rhuntis with foreign protein

ST ANNE S HOSPITAL

JERRY HAYDEN Ear, nose and throat clinic

HARRY M PETERSON Surgical demonstration and clinic

Thursday Morning
MOUNT SINAI HOSPITAL
JOSEPH C BECK ALFRED LEWY JACOB LIFSCHUTZ S M

MORWITZ FRANCIS LEDERER, M. R. GUTTMAN and associates Clinics

ST JOSEPH'S HOSPITAL

Austin A Hayden Conservation of hearing mastoid and sinus surgery

Thursday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS
NATIMAN H FOX and JOHN W HARNED JR Rhinologic
surgery allergy in relation to otolaryngology
FRANCIS LEDERER and N T PATTENGALE Cancer of the
ear nose and threat

RUSH MEDICAL COLLEGE
GEORGE I SHAMBAUGH IX and LINTON WALLNER The

treatment of deafness

Friday Morning
EVANGELICAL DEACONESS HOSPITAL
JOHN M BICK Submucous resection and tonsillectomy

MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIFSCHUTZ, S M
MORWITZ, FERNCIS LEDERER, M R GUTTMAN and
associates Clinics

ics Friday Afternoon

RESEARCII AND EDUCATIONAL HOSPITALS
A R HOLLENDER Physical therapeutic methods
W THEOBALD LASAI accessory sinus disease
PAUL H HOLINGER Bronchostopy and esophagoscopy

RUSH MEDICAL COLLEGE
Daniel B Hayden and E L Chainski Conditions producing limitus evaluation of methods of treatment

Days to be Announced
BILLINGS MEMORIAL HOSPITAL

J R Lindsay Petrositis septic ofitis and lateral sinus thrombosis

CHILDREN'S MEMORIAL HOSPITAL
GEORGE LIVINGSTON PAUL HOLINGER and associates
Intracranial complications of ear infections bronches

Intracranial complications of ear infections bronci
copy in children endoscopic cases

COOK COUNTS HOSPITAL

I MUSEAT Plastic surgery of the nose and face
S PEARLINE Diseases of the neck and larynx including
laryngoscopy and bronchoscopy
L CURRY Mastoudius and meningits
A Lewy The mastoud and the labyringth

T C GALLOWAY and H E DAVIS Selective treatment in malignancy about the head

ILLINOIS EYE AND EAR INFIRMARY

ALFRED LEWY Chronic suppurative outils media
JOHN CAYAMAUGH Chronic sinusitis diagnosis and surgical treatment

OTOLARYNGOLOGY

Monday Afternoon

ILLINOIS EYE AND EAR INFIRMARY SANUEL SALINGER SIDNEY POLLACK and BERNARD M Cones Plantic surgery of the nose manal fractures

nasal and ear prostbeses. RESEARCH AND EDUCATIONAL HOSPITALS OLIVER E VAN ALYEA Surgical anatomy of the nasal

MANUEL G SPIESMAN Diseases of the pharyne.

SYLVIO A SCIARETTA Conservative treatment of chronic suppurative otitis media

RUSH MEDICAL COLLEGE

LOUIS T CURRY and FRANK WONTAK, Sulfanilamede m the treatment of meningitis

Tuesday Morning

MOUNT SINAL HOSPITAL JOSEPH C BECK ALPRED LEWY JACOB LIPSCHUTZ S M

MORWITZ FRANCIS L LEDERER M R GUTTEAN and associates Climes. MICHAEL RELSE HOSPITAL

MAX CUTLER JEROME E STRAUSS and SAMUEL PEARL MAN Radium therapy in malignant tumors of the head

and neck demonstration of cases and technique ST JOSEPH 5 HOSPITAL AUSTIN A. HAYDEN Conservation of hearing mastered and

sinus surgery

Tuesdan Afternoon

MICHAEL REESE HOSPITAL SAMUEL SALINGER and CASPER EPSTEIN Masal and facial plastic surgery treatment of injuries to the face

RESEARCH AND EDUCATIONAL HOSPITALS FRANCIS LEDERER Ear nose and threat plastic surgery
PAUL H HOLINGER Diseases of the larymx

RUSH MEDICAL COLLEGE ELMER HAGENS and PALL CAMPBELL Pathology of the petrous bone in cases dying of meningitis lantern lides. ST MARY OF NAZARETH HOSPITAL

I J KRULEN Mastorditis in children

Il ednesday Moruing MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIFSCHULL S M MORWITZ FRANCIS LEDERLA M R GLITHAN and associates Clinics

ST ELIZABETH S HOSPITAL

F A DULAK Ozena

II ednesday Afternoon RESEARCH AND EDUCATIONAL HOSPITALS

J THEOBALD Complications of middle ear infections SHERMAN L. SHAPIRO Neuro-otology Dz. PELOUZE. Deep neck infections.

RUSH MEDICAL COLLEGE TROMAS W. LEWIS and RICHARD WATKING CAUSAING factors and results of treatment of vasomotor rhuntus with foreign protein.

ST ANNES HOSPITAL

JERRY HAYDEN Ear nove and throat clinic. HARRY M PETERSON Surgical demonstration and clinic, Thursday Morning

MOUNT SINAL HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIPSCHUTZ S M MORNITZ FRANCIS LEDERER M R. GUTTHAN and associates Clinics.

ST JOSEPH'S HOSPITAL

AUSTINA HANDEN Conservation of hearing masterd and sinus surgery

Thursday Afternoon RESEARCH AND EDUCATIONAL HOSPITALS

NATHAN II FOX and JOHN W HARNED Jr. Rhinologic surgery allergy in relation to otolarypgology FRANCIS LEDERER and & T PATTENGALE. Cancer of the ear pose and throat

RUSH MEDICAL COLLEGE GEORGE E SHAMBATCH IR and LINTON WALLNER, The

treatment of deafness

Friday Morning EVANGELICAL DÉACONESS HOSPITAL

IOUN M BICE Submucous resection and ton-illectomy MOUNT SINAL HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIPSCHITZ S M MORWITZ, FRANCIS LEDKER M R. GUTHMAN and associates Chinca

Friday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS

A R HOLLENDER Physical therapeutic methods, W THEOBALD \a.al accessory inus disease PAUL II HOLENGER Bronchoscopy and esophagoscopy

RUSH MEDICAL COLLEGE DANIEL B HAYDEN and E L CHAINGET Conditions producing timutus evaluation of methods of treatment.

Days to be Announced BILLINGS MEMORIAL HOSPITAL

J R LINDSAY Petrositis septic otitis and lateral sinus thmmbosis

CHILDREY'S MEMORIAL HOSPITAL

GEORGE LIVENGSTON PARE HOLFAGER and associates. Intracramal complications of ear infections bronchoscopy in children endoscopic cases

COOK COUNTY HOSPITAL I MUSEAT Plastic surgery of the nove and face.
S PEARLEAN Diseases of the neck and larynx including

laryngoscopy and bronchoscopy

I. CURY Mastordates and meningries.
A Lewy The mastord and the labyrinth.
T C Gaeloway and IL E Davis Selective treatment in malignancy about the head

ILLINOIS EYE AND EAR INFIRMARY ALFRED LEWY Chronic suppurative outis media. TOES CANANCEE. Chronic sinulities diagnosis and surge

cal treatment.

SURGERY

GYNECOLOGY AND OBSTETRICS

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RECURRING MYXOMATOUS, CUTANEOUS CYSTS OF THE FINGERS AND TOES

ROBERT L. GROSS, M.D., Boston, Massachusetts

YXOMATOUS, cutaneous cysts or so called "synovial lesions of the skin" have received little attention in medical literature The scarcity of adequate descriptions of the condition and the unusual experience of exeising one of these innocuous looking cysts of the finger only to have it recur after multiple removals have led to the following study A cutaneous condition such as is here described might seem to be primarily of dermatological interest, but since these peculiar cysts are usually extirpated by surgeons who have the embarrassment of seeing them recur repeatedly, it is appropriate to present this material in a surgical journal My attention was called to the subject by Prof S B Wolbach who first encountered such a lesion (Case 1) in 1928, the findings in this instance being unique in his extensive knowledge of pathological material This original observation and the subsequent study of 7 additional examples form the basis of the present report

These thin walled cysts, filled with a colorless, gelatinous, viscul fluid and occurring on the dorsal aspects of the fingers or toes arrest the attention on two accounts First, they are extremely refractory to surgical treatment,

I rom the Surgical and I athological Services of the Peter Bent Brigham Hospital and the Harvard Medical School but can usually be cured by radium or x-ray irradiation. Second, their pathogenesis is puzzling and the cause for the my comatous degeneration of the derma which gives rise to the cyst formation is as yet unexplained.

Interest was initially directed to the condition by Hvde in 1883, who in a later edition of his Diseases of the Skin in 1897 gave credit for the original description to Jones and Markins of St Thomas' Hospital, London, when they exhibited several specimens before the London Pathological Society Succeeding accounts were usually made in the form of presentation of cases for diagnosis at dermatological societies. The total number of reports in the literature is small and only 14 could be accepted and used for analysis, the data of which appear in Table I The lesion is obviously rare, yet the finding of the last 5 cases herein reported within a period of 2 months makes it probable that the condition is more common than was formerly suspected

CLINICAL FINDINGS

The cysts are usually about the size of a pea, though they may vary considerably in overall dimensions. The smallest one in the present series (Case 7) was 5 millimeters in diameter and 3 millimeters high, while the largest ones (Cases 6 and 8) were each 12 millimeters in

greatest length Inspection shows these swellings to he smoothly rounded, thin walled structures which often can be transilluminated Occasionally, the wall is thin enough so that the lesion has a vesicular appearance. The color is that of normal skin, but there may be a lainty cellowish or blush east. The skin surrounding the base of a cyst does not show any increased vascularity unless there has heen a superimposed secondary infection External pressure will not reduce the size of the mass for the cyst cavity does not communicate with a joint hursa, or tendon sheath Tenderness is usually midl or absent

In all of the 14 cases gathered from the literature and in 7 of the examples here re corded a finger was involved by the lesion. but in 1 of our patients (Case 2) the same con dition was found on a toe In 15 cases in which information is available, the right hand was involved in 12 and the left in 3. The number of lesions appearing on the various fingers was as follows thumb, 2, index finger, 6, middle finger o ring tinger, o little finger, 1 The toe involved in our second case was the nght middle one Such a cyst is found only on the dorsal surface of the digit, usually in proximity to a joint which most often is the distal interphalangeal articulation found in the neighborhood of a joint, it is likely to be situated a little to one side of the midline of the digit (Fig I frontisprece), but if it is situated some distance from a joint, it may be in the midline (Fig. 17)

The condition is not distributed equally be tween the two sexes, for 75 per cent of the pa tients were women. The youngest age at which the lesson has been described was 26 years and the oldest was 66 years, the average being 48 years.

The chuical history reveals that these cysts have usually been present for considerable periods of time varying from several months to a few years, the average being about 9 months. The patient frequently states that the cyst has been pricked open on several occasions, believing the vesicle to be of little consequence. When this drainage has been done the fluid thus released is always described as being clear and colorless and having a syrupy consistency. In every instance the

individual was surprised to find that such drainage gave only temporary relief and was folloned by prompt recurrence in two to four weeks time

PATHOLOGY

The benign appearance of these lesions and the slight attention which is paid to them in their early stages makes it impossible to study specimens showing the first changes, for these are seldom surgically removed. Recurrent lesions, however, have been excised fairly soon after their reappearance so that this material can be utilized for observing the changes which take place prior to actual cyst formation. The completch formed cysts have been occasionally examined histologically and the findings in this stage are more familiar. The following description represents the pathological changes as far as we have been able to study them.

The first variation from the normal appears to be a degeneration or resorption of the collagen in a localized but poorly limited area of the derma (Figs 4 and 5) The fibroblasts remain as a sort of skeleton framework with but little intercellular material. These connective tissue cells apparently persist in a fairly good state of preservation for a long time, at least they show degeneration much more slowly than does the collagen Between the separated cells there then collects a faintly staining, hasophilic, mucoid material which gradually increases in amount (Fig. 3) and the cell processes and fibrils become widely separated so that the tissue has a very loose texture As these changes proceed, the widely spaced fibroblasts gradually disintegrate and multiple minute cavities appear (Fig. 6) These gradually increase in number and size and finally coalesce so that a cyst forms which is grossly visible and which contains a clear and glamy fluid of gelatinous or syrupy con Thus in the earliest formed cysts the walls have a loose textured and myxoma tous structure and may be irregular or jagged (Fig 2) If the cyst is left undisturbed for a considerable period of time (possibly several months or more) its inner wall becomes smoothly rounded more dense, and well de fined When this stage is reached a rather

TABLE I -LIST OF PRI VIOUSI'S PUBLISHED CASES

Author re		Age Sex	Digit Involved	Size of lesson	Duration of disease	Treatment and results	
Lingenfelter	1913	j'	Dorsal surface over distal poterphalangeal joint right mid lie finger	l ca size	14 mos	Incision—recurred l version—recurred l version—recurred Lastenation with nature and carbolic CO; snow—recurred Fulluration—recurred Tratted with respons and salucylic acid ryystals—recurred Lyaversoures (* dose)—cured	
Ormsby	1913	16	Dorsal surface distal articulation right middle finger	Larger than 5 mos		Fyer ton—recurred Incision—recurred Incision—recurred Radiotherapy—cured	
Ormsby	1913	18	Distal phalant index finger	Pea size	3 mos	Freision—recurred Incisi m—recurred Radiotherapy and electrolysis—cured	
Ormsbv	1913	10	Over distal articulation of index finger	Larger than	4 mos	Radiotherapy-cured	
Ormsby	1913	66 M		Pea size	25 mos	Incision and electrolysis-cure l	
Sutton	1916	58 1	Distal phalany right mildle finger	Pea size	18 mos	Incision-recurred	
Sutton	1916	26 F	Dorsal surface of metacarpophalangral joint index fingre	Pea size	5 mos	Radium treatment—cured	
Pussey, quoted by Nackee and Andrews (7	1921	г	Over distal phalant right middle finger	Pea size			
Pussey, quoted by Mackre and Andrews (7	1921	и	Over distal interphalangeal joint right middle finger	Pea size			
Montgomery and Culver	2921					Franciscomercurred Curettage—recurred Cauterized with truchloracetic acid— recurred reversed	
Montgomery and Culver	ntgomery and Culver 1922					Repeated surgical operations—recurred Radium—cured	
Montgomery and Culver	1922		Over distal interphalangeal junt right inder inger				
Savatard (Case 2) 192		46	Dorsal aspect distal interphalingeal joint right fifth linger	Pea 3120	8 yrs	Excised?result	
Savatard (Case 3)	1924	26 M	Just below nail of right	4-5 mm in	Few months	Application of phenol-recurred	

normal appearing derma abutts directly on

the cyst lumen (Figs. 7, 13, and 16)

When these lesions have been completely eveised and studied for possible connection with a subjacent structure (such as joint cavity, tendon sheath, or bursa) no communication has ever been demonstrated. From this description and from the ease reports it may be seen that there is no epithelial or endothelial liming to the cysts (I igs. 8, 13, 16). Therefore, the mucoid material which collects in such a cyst is in no way a sceretory product but must be regarded as having its origin only from degeneration of the local connective issue.

One of the unusure extended features in both the early my comatous substance and the fully developed cystic lesion is the absence of any appreciable leucocytic infiltration. Wandering cells are tarely seen, and when present are usually of the lymphocytic series and appear in only small numbers. In no case lines there been any evidence of hemorrhage, either old or recent, so that local hemorrhage (from trauma, etc.) cannot be regarded as the primary event in the histological changes. The microscopic picture does not suggest that matretion will explain all of the findings. Furthermore, the blood vessels of neighboring.

tissues do not show changes with sufficient frequency to regard them as important Artentis or other pathology of the vessel walls has not been observed or recorded either in the published case or in the present series but in one case we found old fibrous thrombi in regional vessels. These thrombi however may have heen formed as a result of previous therapeutic procedures.

ETIOLOGY

The pathogenesis of this type of cutaneous cyst is unknown. The condition represents a localized degenerative process in the conum the originating cause of n hich is very obscure As was previously pointed out in the section on pathology the connective tissues of the deeper portions of the conum undergo a my romatous change the collagen gradually disappears and a basic staining mucoid ma terial collects between the remaining fibro blasts This loose textured substance forms the swelling seen in the earliest lesions and at this stage there is no actual lumen present on gross examination \s the process con tiones honever liquefaction occurs in the central portion of such my romatous tissue and this hollowing out results in a cavity alled with semi fluid material. There is then no secretory activity concerned in the development of the lesions in other words the fluid found in the cyst is not produced by a mucous membrane lining the cyst wall for such a layer does not exist. In short, the cavitation results solely from a focal degeneration of the dermal laver of the skin

It is difficult to understand why a small area of connective issue should undergo this spontaneous autolysis. It is even harder to comprihend why it should continue to do after repeated excisions of the local mass Only two theories seem worthy of consideration. First local injury may he of some importance for the sites of election (dorsal surfaces of the fingers) are constantly exposed to trauma of varied sorts. Repeated knocks blows, continued pressure squeezing etcusually minor enough to he forgottern—may possibly so after the derma that degenerative processus are instituted. Second thrombosis of small atternal channels may cause the re

gional blood supply to vary so that incomplete or partial nourishment produces these changes

Several authors have expressed the view that these myxomatous lesions might have a derivation from a nearby joint cavity or ten don sheath, set it is a fact that no one has ever demonstrated such a communication. It has been common experience which is further substantiated by our Cases 1 2, 3, and 6 that complete excision of the lesion is possible with out cutting across a lumen leading to such structures Furthermore, microscopic ex aminations of the cysts have not shown any extraneous connections Therefore the term 'synovial lesions which some writers have employed in designating these crists is an im proper one and is misleading. In summary the idea that the cost is an outpocketing of one of the serous membranes of a digit is wholls untenable

Savatard presented 3 cases of 'Peri Articu lar Fibroma of the Skin (Synovial Lesion of the Skin) the first of which was a solid fibroma and was obviously different from the condition under discussion. His second case honever appeared to be typical of these synovial lesions and nhile Savatard beheved this to represent a cystic degeneration ol a fibroma his description and illustrations cast grave doubt on this view lo his third case bionsy examination was not made, but it has undoubtedly one of the cysts here discussed This author's material does not lend any justifiable evidence to the view that a my tomatous cast of the digit may originate from a fibroma

Nachlas reported a series of 'Cystic Nod ules of the Terminal Finger Joints which may possibly have some relationship to our myx omatous cysts. The nodules which Nachlas described were believed h him to he precursors in the formation of Heherden's nodes of hypertrophic osteo-arthrits. This author did not include any pathological description of his material hence it is impossible to draw analogies or differences in the two conditions yet someof his gross descriptions were strongly terminiscent of the cysts here presented How ever, lack, of further evidence prohibits the elaboration of this discussion

TABLE II -LIST OF CASES IN PRESENT STRIES

Case	Age Set	Digit involved	Size of lesson	Duration of less on	Treatment and results
ı	N	Right middle finger distal phalany base of nail	5 mm diameter	Io mos	t Opened-recurred 3 Opened-recurred 3 Opened-recurred 4 Opened-recurred 5 Incised-recurred 5 Incised-recurred 7 Total excision-recurred 7 Total excision complicated by entre secondary infection-cured
2	Şi i	Right milidle toe Lateral aspect near distal interphalangeal joint (Fig. 1)	8 mm diameter	r month	r Incised—recurred 2 Excised—recurred 3 Aspirated—recurred 4 Toe amputated
3	60 F	Right middle finger over distal inter phalangeal joint (Fig. t. inger and section)	4 mm diameter	2 mos	Franced—recurred Fray (600 r)—cured
4	50 F	Left midde finger on terminal phalanx (Fig. 9)	trmm long omm uide omm high	s mos	Incision—recurred Incision plus x ray (600 r)—cured
5	65 F	Right index finger over terminal inter phalangeal joint (Fig 12)	6 mm diameter	130	ray (600 r) had little effect Cyst incised and evacuated—cured
6	46 F	Right middle finger near distal inter phalangeal joint (Fig 14)	22 mm long 8 mm wide 5 mm high	t yr	r Excision—recurred 2 Fxcision—recurred 3 Inc: on plus x ray (600 r)—recurred 4 Aspiration plus x ray (600 r)—partial recurrence 5 Total excision—cured
7	i ⁶	Left index finger on terminal phalane (Fig. 17)	5 mm diameter 3 mm diameter	9 mas	Excision plus x ray (600 t)—cured
8	10	Left thumb on terminal phalant (Fig. 18)	7 mm long 12 mm wide 5 mm high	3 mos	Incision plus x ray (600 r)—cured

A review of the material shows no evidence of neoplasia. The persistence of these cysts for months or years and the manner in which they recur again and again after excision would at first suggest that there may be some new-growth which recurs locally after extirpation. The findings however are those characteristic of a degenerative and not a neoplastic lesion.

In passing, it must be noted that other parts of the body may possibly have cutaneous lesions such as are here described on the digits A case in point is that of Letulle and Bazy This patient, a girl 17 years old, had a "synovial lesion" on the palmar aspect of the wrist which repeatedly recurred after excision and required four operative removals Histologically, there was a my vomatous type of central degeneration similar to that which we have seen on the fingers and on a toe Furthermore, there has been a growing opinion for many years that all ganglia such as occur on the back of the hands and wrists do not represent outpocketings of joint or tendon sheath cavities, but some are the result of a collagenous degeneration of the local connective tissue (Clarke) It is possibly this difference of origin of "ganglia" (outpocketings of sheaths and joints as opposed to degeneration of connective tissue) which accounts for the success or failure (30 per cent recurrence) following their surgical removal We are led to believe that included in those cases which have been classified as "ganglia" there may have been some instances of the pathological process such as is here described as occurring on the digits

TREATMENT

A review of the cases listed in Tables I and II shows the various forms of treatment which have been obtained in each instance. It has been learned empirically that most surgical therapy, including drainage, excision, curettage, and insertion of sclerosing or caustic fluids is without avail, whereas x-ray or radium irradiation in adequate dosage is almost universally successful in producing a permanent cure

Incision and drainage Many patients had often voluntarily pricked open the cysts on multiple occasions before seeking professional

tissues do not show changes with sufficient frequency to regard them as important Arteritis or other pathology of the vessel walls has not been observed or recorded, either in the published cases or in the present series, but, in one case we found old fibrous thrombin in regional vessels. These thrombin however, may have been formed as a result of previous therapeutic procedures.

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x-rays or radium is the treatment of choice The reports in the literature have practically no discussion regarding the necessary amounts of exposure which are required Sutton (13, 14) treated 1 patient successfully, apparently using 10 milligrams of unscreened radium, one-half hour daily for 8 doses, making a total dosage of 40 milligram hours We have employed x-ray therapy in 6 cases using each time 600 r (300 r for 2 doses, 2 days apart) In 5 lesions thus treated there was no recurrence but another patient (Case 6) was given an additional 960 r (430 r in 2 doses, 2 days apart) which reduced the size of the cyst to about one-third of its former volume limited experience with x-ray treatment of these cysts makes it probable that further experimenting will be necessary in order to ascertain the dosage which will be effective in all cases One gams the impression that an intense local reaction must be set up in order to be effective, and that at least an erythema should be produced

CASE REPORTSI

Case 1 C II was a 51 year old man who noticed a small blot about 5 millimeters in diameter at the base of the half of the right middle finger. He opened this with a pin and expressed some gelatinous material, but the cyst reappeared within several weeks. The patient further opened this structure on 3 occasions during the next 4 months, but following each of these the cyst again reformed. At the end of 5 months it was then incessed by a physician and the performance of reappearing was again enacted. Examination (to months after the origin of the cyst) showed a small, thin walled translucent vessele about 5 millimeters in diameter lying just at the base of the hall, in the midline of the terminal phalanx.

Under local anesthesia the entire cvst, with a little of the surrounding normal tissue, was excised In 4 months a similar small cyst had recurred and excision of the lesion was again performed under novocaine anesthesia. A few days after this second operation, the site showed evidence of infection with involvement of the surrounding soft tissues as well as the underlying bone. After great difficulty in treating the osteomyelitis, the inger bealed and though the terminal phalanx is slightly deformed from the secondary infection, there is no evidence of recurrence of the cyst 8 years later. (Without doubt the extensive local inflammation played an important role in the bealing of this lesson which 5 previous missions and r excision had failed to cradinate.)

11 am indebted to Dr. Francis Newton. Dr. Harlan Newton and Dr. David Cheever for their kind permissions to include Cases 1 2 and 3 respectively.



Fig. 3 Photomicrograph of recurrent mysomatous lesion of a finger (Case 1) removed at second operation. This ussue shows the change which takes place in the derma preceding cavity formation. The cornum, in most of the field, has lost a large portion of its collagen and has a loose textured structure. There is no leueocytic reaction \$\times 40\$

Pathological examination of the first surgical specimen showed it to he an oval shaped piece of skin 8 millimeters long, 5 millimeters wide and 5 millimeters thick In the middle portion of this, and bulging up on the external surface was a small thin walled structure about 4 millimeters in diameter which when sectioned was found to contain a thick, gelatinous, somewhat stringy material resembling mucus Microscopically, the cystic area lay wholly within the derma and consisted of an irregular cav ity, the walls of which were formed by an edematous connective tissue of very loose texture and which was directly continuous with and merged into the adjacent corium (Fig 2) It appeared that the derma in this area had undergone a degenerative change, the first phase of which was a resorption of collagen, leaving a loosely noven meshwork of fibroblasts, between the cell processes and fibrils of which were small amounts of some flocculent, baso philic staining material. In the central portion of the lesion degeneration was more marked and had advanced to actual cavitation. There was, then, no epithelial or endothelial lining to the cyst. In the tissues surrounding this cyst there was no apparent change in vascularity, and infiltrating leucocytes were found in only small numbers, those present being mostly lymphocytes Toward one edge of the c)st was a narrow rim of epidermal cells dipping down and surrounding a part of the loose texture tissue in such a way as to give the impression that the epidermis was attempting to surround and wall off or extrude this abnormal substance

Pathological examination of the material remoted at the second operation showed it to consist of a small piece of skin with a centrally placed light gray soft module 2 to 3 millimeters in diameter which lay in the consum and which bulged up the overlying in the consum and which bulged up the overlying



Fig. 4. "Printomic registration is recurrent improfitations of the dust industration includes an entire cross section of the dust which was amputated at the second operation of the distribution of the containing the degeneration in its consum (this nortice less in the best project of the more distribution). The property of the containing the degeneration in its consum (this nortice) and been existed its months provisedly light property of the property of the containing the second in larger case of the containing the containin

epidermis Histologically portions of this material showed cicatrization and organization which most likely resulted from the previous operative procedure. The greater part of the specimen however again showed a very loose texture my xomatous type of connective its ue replacing the dermal layer



from the right upper portion of the lesson illustrated in I igure 5. The patholo, calc change is confined to the derma and is a localized degeneration of this layer. The myromatous substance toward the left has no evidence of neoplasm. The three zones marked x represent beginning cavitation. X45

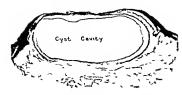


Fig. 5. Photomstrograph showing higher details of the cutaneous nodule seen on the right side of Figure 4. The area of degeneration in the conum has no well defined borders. There is no communication with underlying structures such as joint cavity or bursa. X13

localls (Fig 3) There was no line of demarcation between the more or less normal appearing corium peripheralls and the centralls located loose testured lesson to large central cyst was seen but there were several small cavities scattered through the areas of mucoid degeneration

CASE 2 C S was a 54 year old man who com planned of a cystic swelling on the right third toe of month's duration Framination showed a nontender translucent rai ed and rounded swelling on the lateral aspect of the toe over the distal inter phalangeal joint. This was inci ed and a clear viscid material like vitreous of the eve was evacu ated with resultant collapse of the cost. Cultures showed no growth The wound healed per primiting but in 4 weeks time there was recurrence and a mass 7 to 8 millimeters in diameter had re formed Under local anesthesia this was excised and the sac wall of the cost was completely removed munication with the neighboring joint could be demonstrated The wound healed well month later there was evidence of a small fluctuant swelling beneath the old scar This was punctured and a colorless vi cid material was aspirated. Cul tures of this showed no growth. Following the last aspiration the lesion quickly recurred and then gradually grew to attain a diameter of 8 millimeters during the course of the following to months this time local findings were those illustrated in Figure 1 The cast was now somewhat tran lucent had a broad base and projected well above the sur face of the surrounding din Amputation of the toe was decided upon and was performed

Pathological examination of the first specimen showed a small elliptical piece of skin containing a centrally placed vesicle 7 to 8 millimeters in diam eter which lay within the derma and which wa



GROSS

Fig. 7. Photomicrograph of cross section of entire cystic leaon removed from a finger (Case 2). The smooth walled cavity lies wholly within the derma, for a narrow into of this connective tissue can be traced over the entire dome of the cyst. There is no epithelial or endothelial lining of the cavit. There is no communication between the cyst and the deeper structures. The epidermis dips in deeply at either side of the cyst as though it is attempting to sur round and extrude the lesion. For higher power detail see Figure 8. Xfs.

covered externally by a thin walled epidermal coat This cost had a faint bluish color, and incision of it produced a few drops of crystal clear viscid material resembling that of the vitreous humor of an eye This was acid in reaction (to phenolphthalein indicator) and produced a white precipitate with acetic acid Histologically there was a cyst lying wholly within the derma. While connective tissue entirely surrounded the cyst there was only a very thin (o 5 millimeter) layer of it superiorly separating the cost cavity from the overlying epidermis. The cyst did not have any epithelial or endothelial lining its walls being composed only of connective tissue of varying density. Around most of the cyst wall this tissue was somewhat dense and possessed a dense collagenous intercellular substance, but elsewhere it had a loose textured edematous or myxomatous appearance and collagen was quite scanty in amount In the wall of the eyst, blood vessels were possibly somewhat more numerous than in normal corium. but this appearance may have been due to loss of local supporting substance and apposition of previously existing vessels. A few scattered lymphocytes represented the only leucocytic infiltration

Pathological examination of the accord singual spectimes (amphated too's showed the cyst over the lateral aspect of the terminal interphalangeal joint as described in the clinical notes here given. The specimen was hardened in 10 per cent formahn (raising the cyst to shrink greatly) and was then decalefied in order that celloidn sections might be cut through the entire toe. Careful microscopic study was done and 28 sections were cut at various levels through the lesion for the purpose of ascertaining whether or not there was a connection with the sunovial membrane of the adjacent joint. Noahre did the lesion communicate utils the joint nor assistance any connection with the noal bed. The whole process was confined to the corting of the skin and

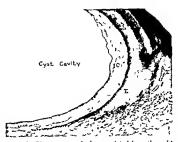


Fig. 8 Photomicrograph showing detail from the right end of Figure 7. The connective tissue around the cyst cavity has a loose texture, which is seen best toward the night. There is no cyst lining C, Corium, E, epidermis

showed only a localized my comatous tissue without sharp boundaries (Figs 4, 5, and 6). In the central portion of the lesion, the connective tissue had widely separated, delicate fibrils. The type of cell and cell processes resembled in general those found in embryomic connective tissue and that seen in my comatous tumors (Fig. 6). There was no leuco cytic infiltration of importance. No abnormal vascularity appeared in the surrounding tissues and no thrombus was found in any vessel. There was no evidence of neoplasm. The process was regarded as a peculiar my comatous degeneration of the coroum.

CASE 3 F C was a 60 year old woman who originally noticed some abnormality over the dorsal aspect of the terminal interphalangeal joint of the right middle finger 21/2 months prior to the time she sought medical attention. During the early part of this interval there was a mild pain and tenderness in the described region, but this disappeared and was followed by the production of a small swelling which was not particularly sensitive, but which was likely to be bruised and thereby made intermittently pain ful Local examination showed evidence of slight hypertrophic arthritis of the fingers dorsally over the last interphalangeal joint of the fingers, and somewhat toward the ulnar side, there was a slightly raised swelling about 4 millimeters in diameter, such as is pictured in Figure 1 The cover ing of this was quite thin and the vesicle seemed to contain a clear fluid, though it was under great ten sion and was non compressible. Its base faded away into the normal surrounding skin without an arcola of any sort As a whole it was slightly movable over the underlying tissues The fact that its fluid could not be pressed out made it certain that it did not communicate with a joint, bursa or tendon sheath Under local anesthesia the entire lesion was cleanly and completely excised, without rupturing it. The

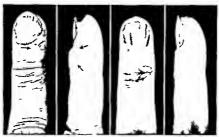


Fig 9 Myromatous cyst of left middle finger (Case 4)

Fig so Same as Figure nine-4 months after x ray treatments

wound healed well but 2 months later a reddening developed in the sear and a slight elevation was evident which strongly suggested beginning recurrence when seen again 6 months after the operation there was a slight elevation at the operative site without a definite viscular appearance Accordingly x ray irradiation was instituted (unfiltered rays—600 r—divided into a dose x days apart) Following this the mass disappeared and there is no further evidence of recurrence; year after x ray therefore

Pathological examination showed an elliptical piece of skin in the central part of which was a rounded raised mass about s millimeters in diam eter which produced a dome like swelling on the skin surface The external surface of this rounded struc ture was smooth and did not have any fissures or hairs The general character of the lesion was one of an unusual type of dermal cyst covered by a thin translucent membrane beneath which could be seen a droplet of clear fluid In order to preserve the structure and the histological relationships of the mass it was first fixed in 10 per cent formalin and then a single section was made across it When this cut was made a small well defined cavity was found which was filled with a pale slightly cloudy mucinous fluid (Fig 1) The corium of the adjacent skin ex tended down under the cost and allo a very thm layer traversed its roof (interposed between the cyst proper and the overlying epidermis) Histologically there was a clearly defined cyst situated wholly within the derma (Fig 7) Only a very thin layer of cornim was seen between the cost and the distended overlying epidermis but this finding characterized the lesion as being of dermal and not enidermal on on Epidermal processes extended downward and inward at either side of the cyst (Fig 8), this ar rangement taking place in such a way as to suggest that this might he an attempt on the part of the

epidermis to surround the cyst and possibly to etrude it. The inner liming of the cyst was smooth and consisted only of connective tissue of the corum, there being no epithelial haing. Immediately surrounding the cyst cavity the connective tissue of the walls had a loose texture which is seen best at either end of the cyst (Figs. 7 and 8). Wegert stains for elastic tissue showed a definite decrease in the number and size of the elastic fibers in the love textured areas immediately adjacent to the cyst cavity. The lesion appeared to be completely exressed (set there was recurrence as noted above)

CASE 4 J B was a 50 year old white woman who complained of a gradually enlarging cystic mass on the left middle finger. This lesion, which had been present for 5 months was the seat of moderate dis comfort when it struck against various objects Ex amination showed a fluctuant cystic non-tender swelling 11 millimeters long, 9 millimeters wide, and 6 millimeters thick over the dorsomedial aspect of the terminal phalanx which would transmit light The nail, when viewed from the end of the finger, was flattened and depressed on its medial third \ot recognizing the character of this lesion we incised it and a clear myxomatous colorless substance was evacoated By expressing the contents of the cyst a normal configuration of the finger was regained Within 2 weeks time the cyst began to reaccumu late fluid and at that time the photograph of Figure o was taken This illustration, therefore does not in dicate the full size of the cyst before the original incision had been performed. Further treatment was instituted by a second incision and drainage 2 weeks later followed ammediately hy 2 x ray irradi ations (2 days apart) employing unfiltered rays at 140 Lilovolts with a total dose of 600 r With this therapy the lesion bad remained cured when seen 4 months later (Fig 10)

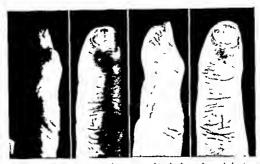


Fig. 11. Left, Mysomatous cyst of corum on right index finger of 3 year's duration (Case 5). In the photograph on the right, notice the depression of the nail which is apparently caused by pressure on the nail bed by the adjacent mysomatous cyst lig. 12. Same as I gipur et 11—4 months after incision and drainage combined with x my irradiation. The distal one half of the nail is still grooved, but the regenerated proximal half has a normal contour.

CASE 5 E B was a 65 year old white woman who complained of a small, hemispherical mass on the right index finger, which had been gradually progressing in size for 1 year and had interfered with her activities as a seamstress. On some occasions there was a local tenderness and pain, but these complaints were less annoying than the inconvenience caused by the swelling Examination showed evidence of a moderate degree of hypertrophic arthritis of the terminal interphalangeal joint and also the lesion as seen in Figure 11 This mass, located on the dorsomedial aspect of the finger and situated just distal to the articulation, was deficitely cystic, transmitted light, and was non-tender. It was slightly fluctuant, smoothly rounded, and had a pinkish tinge There was a slight grooving of the finger nail on this side, this change being apparently due to local pressure on the nail hed by the overlying cyst Without performing a hiopsy, 2 x ray treatments were given on a subsequent days, unfiltered rays and a total dose of 600 r being used at 140 kilovolts Since there was no appreciable decrease in the size of the cyst during the next 6 weeks it was concluded that regardless of what change the x ray treatment had effected in the cost wall the local swelling would persist until the contents of the cyst was evacuated Therefore, incision was made into the cyst, the contents expressed, and a normal con-tour of the finger was obtained. The evacuated material was translucent, clear, glairy, and mucoid The smooth internal surface of the cyst had a light gray color A portion of the roof of the cyst was re moved for biopsy Wound healed promptly with no return of the cyst in subsequent 4 months (Fig 12) The regenerated finger nail developed a normal contour

Pathological examination of the specimen showed the cyst wall to consist only of connective tissue of the corium (Fig. 13). The corium, between the cyst cavity and the overlying epidermis, was essentially normal in appearance. Its collagenous tissue was fairty dense, this change being probably due to x-ray irradiation. The vascularity of the derma was slightly increased, and a few lymphoid cells surrounded the capillary tessels. These two features may also have been due to irradiation. The cyst exity had no epithelial or endothelial lining. Some of the mucoid material removed from the cyst at operation, which had been fixed in Zenher's fluid, and



Fig 13 Photomicrograph of roof of cyst from Case 5 (Fig 11) The epidermis E, and the corumn, C, are essen tails normal. The cyst cavity, which was filled with mucoud material, does not have any epithelial lining X125

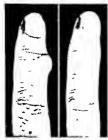


Fig. 14. Left. Myxomatous cyst of right middle finger of 1 year's duration (case o). This levon had been exceed on two previous occasions. Pight vame finger of mostles later following two series of x ray treatments and ubsequent earnor and skin grafting. The grafted area is slightly hyperemic and appears darker in the photograph than does the surrounding skin.

sectioned showed an acellular and structureless mucous substance staining blue in the eo in methyl ene blue sections and a light brown in the phos photung tie acid hematoxylin stains

CASE 6 C. K. was a 40 vear old librarian who complained of a welling on the right middle finger of 1 vears duration. Three months after the appearance of this let on it had been excased by her local physician and the civit had recurred in 2 months. Three months after the first operation the levion had been again exer ed but this was also followed by recurrence. Fixamiation dictioned a time walled fluctuant act with a vellows hip pink color over the program of the pro



Fig. 15. I hotograph of stras pecimen in cross section from Case 6. The cost cavity (which was 4 millimeters in dameter) lay entirely within the critium. A thin layer of the corium can be seen extending over the roof of the cyst, separating it from the overlying epidemis. Y?

cvst readdy transmitted light. Under local anethesia an incr.ion with drainage was performed and a small piece of tis-ue at one edge was removed for Two weeks later x ray therapy was in stituted, giving 2 exposures-2 days apart-at 140 kilosolts unfiltered rays using a total do-age of 600 r In spite of the treatment however there wa recurrence of the cy.t which nearly reached its former proportions in 8 weeks. At the end of the 8 week period the crut was a pirated and about 1 cubic centimeter of colorless clear mucoid fluid was removed allowing the cv t to collapse. Further x ray treatment was immediately given (total dose of 960 r in 2 treatments 2 days apart unfiltered rays at 140 kilosofts) With this theraps the mas gradually reappeared during the next 4 weeks but reached a uze only about one third that of it former volume. The "kin surrounding its base was now quite firm and slightly thickened. The entire lesion was then completely excised and the area was covered with a Thiersch graft. There was no fur

ther recurrence (Fig. 14 might)
Pathological examination of the first specimen
howed unfortunately, that it had been cut from
the cist wall at a laint on that the inner surface of
the cist was not included in the block. The speci men did contain one thing of interest however for
in the corrum which must have been quite close
to the cit wall there was a large thin walled blood
sessed bontaining as old filtowar but now ascularized
this thrombus was in some way related to the format
som of the cist (by alterning local blood supply) or
whether it had formed following the previous opera

tive procedures

Pathological examination of the second specimen
howed an elliptical piece of skin i centimeter long
millimeters wide and 5 millimeters in maximum
thickness in the central polition of it there was
a mall vescular swelling which bulged up on the

Fig. 16 I hotomerograph of pecimen which was removed from Case 6. The cy t has no epithelial lining. The castly is intradernal in position. In the surrounding derma there was found no evidence of leucocytic reaction X13.



"Tig 17 Left Small myromatous cyets of corium on left index finger of 9 months' duration (Case 7) Right, Same, 4 months after incision and x ray treatment

skin surface and which apparently extended down into the derma The external surface of this exst was thin walled There was some slight thickening of the skin around the base of the cyst Examination of the under surface of the specimen showed no sinus or lumen of the cyst, this latter structure was, therefore believed to have been completely excised and was devoid of communications with other cavities of the finger (such as tendon sheath or joint) Transection of the specimen disclosed a well defined cavity 4 millimeters in diameter in the center of the tissue, which cyst lay within the corium (Fig 15) Exuding from this cyst were a few drop lets of clear, colorless, sticky, glairy, gelatinous fluid Microscopic examination (Fig 16) disclosed a cavity without endothelial or epithelial lining. the walfs of which were formed by a corium of in The surrounding derma had an creased density increased cellularity, a dense collagenous structure, and only rare infiltrating leucocytes. In the zones I to 2 millimeters away from the cyst there were an increased number of dermal blood vessels of capillary size The density of the corium and the increased vascularity were attributed to previous operative procedures and to x ray therapy No communica tion could be demonstrated from the cost to underlying structures

Case 7 (Same patient as Case 6) For a period of 9 months the patient had noticed a small cyst appearing over the terminal phalanx of the left index finger, for which no treatment had been instituted Examination showed a small cystic swelling in the midline on the dorsal aspect of the terminal phalanx of the left index finger, lying just at the base of the nail (Fig. 17, left). This exist measured 5 millimeters in diameter and was raised 3 millimeters above the level of the surrounding skin. It readily



Fig 78 Left Thin walled, translucent myxomatous cyst of left thumb of 3 months' duration (Case 8) Right, Same, 4 months after incision and x ray treatment

transmitted light. The cyst was incised and a small bit of itsue was removed from its wall for biopsy. When the wound had healed, x ray irradiation was mututed—2 exposures, 2 days apart, 140 kilovolts and unfiltered rays being used, a total dose of 600 r. There was no evidence of recurrence of the cyst in the ensuing 4 months (Fig. 17, right).

Pathological examination of the hopps specimen showed a dense corium of increased cellularity with an abundant amount of collagen. The vascularity and the cutaneous appendages were normal. A few scattered lymphoid cells appeared around one of the smaller vessels. The portion of the cyst wall which was examined did not show a smoothly rounded cavity, but possessed very irregular side arms and outpocketings. The wall of the cavity showed only a connective tissue of the surrounding derma, there being no cyst lining.

CASE 8 M K was a 49 year old waitress who complained of a swelling on the left thumb of 3 months' duration During this interval the local mass had gradually increased in size, and while there was no associated pain, the lesion produced some local discomfort when it was bumped against various objects There had been no known trauma of importance Evamination showed a raised, ovoid cost over the dorsal medial aspect of the terminal phalant, quite unrelated to the interphalangeal joint, but lying rather close to the base of the nail (Fig. 18, left) This thin walled cyst had a pinkish vellow tinge and readify transmitted light It was 7 millimeters long 12 millimeters wide, and 5 millimeters high Under local anesthesia, a small transverse slit was made in the dome of the cyst and about 1 cubic centimeter of thick, clear, colorless and gelatinous material was expressed. This operation produced a normal contour to the finger The interior of the cyst was unilocular, light gray, smooth, and had no outlet to the joint or other structure The wound healed readily and after 1 week, v ray treatments were given to prevent recurrence A total of 600 r was given, dividing this into 2 dose , 2 days apart at 140 kilovolts and employing unfiltered rays Four months later there was no evidence of recurrence (Fig 18 right)

Pathological examination of the roof of the cyst and the overlying skin showed findings similar to those seen in the previous cases namely a cist nall unlined by epithelial or endothelial layer but sur rounded only by connective tissue of the adjacent conum The derma both adjacent to the cyst wall and elsewhere was e- entially normal in appearance, had an abundant amount of intercellular collagen and lacked any inflammatory reaction. There was no abnormal vascularity of the conum. The cost then, was an unlined structure lying within the corrum and because of the absence of mucoid de generation of its wall appeared to have been of considerable standing

SUMMARY

Clinical and pathological descriptions are made of an uncommon cutaneous condition which is characterized by the formation of a small, recurring, my vomatous cyst of the skin on a finger or toe The cyst is not lined by a secretory epithelial membrane nor does it take origin from an adjacent joint cavity, bursa, or tendon sheath The lesion is a degenerative one and is produced by a peculiar mucoid change in the connective tissue of the corrum, this process leading to liquefaction and eyst formation The cause for this focal degeneration is unknown but may base some

relationship to local trauma Fourteen cases are gathered from the litera ture for study and 8 additional examples are presented Twenty-one of the lesions occurred on the fingers and I was observed on a toe The cysts vary from a few millimeters in diam eter to slightly more than a centimeter in greatest dimension They are commonly located over the dorsal aspect of a distal interphalangeal joint and are usually situated a little to one side of the midline. The cysts

are thin walled and contain a colorless, glairy, mucoid, or gelatinous fluid Three fourths of the patients were women. The youngest age at which the lesion has been described was 26 years, the oldest 66 years, with an average at 48 rears

These my vomatous cysts of the corrum are very resistant to surgical forms of therapy and recur again and again after incision and drainage, curettage, cauterization, or even after local externation Radium or x ray irradiation affords the best method of treatment and has been found useful in preventing a recurrence

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CARCINOMA OF THE JEJUNUM

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ALTHOUGH carcinoma of the jejunum occurs relatively infrequently, it does ment careful consideration. The problem concerns not only a serious lesion but also the accompanying depletion of physical reserve which increases the risk of treatment. For this reason it seems advisable to record our observations in the hope that they may aid in establishing certain enteria for an early diagnosis so that more satisfactory results may be obtained in a larger number of cases.

Of the malignant tumors of the small intestine, sarcomas occur more frequently than do carcinomas. In 1904, Nothnagel reported 243 instances of intestinal sarcoma in 24,358 necropsies, in 6 of the cases the growths were in the ileum and in none of the cases was the growth in the jejunum. On the other hand, Corner and Fairbank, in 1905, reviewed 103 eases of sarcoma of the intestine, in 63 per cent of these cases the growths were in the small intestine and in the majority of the litter cases the growths were in the leturn. The age incidence of intestinal sarcoma is between 30 and 40 years.

Carcinoma has been said to be relatively rare in the portion of the intestine between the pylorus and the ileocecal junction. Hinz, in a study of 584 eases of carcinoma of the intestinal tract, found that the growth was in the small intestine in 18 cases. Bunting reported one instance of carcinoma of the small intestine in 2200 necropsies. Ewing found that 3 per cent of all intestinal carcinomas occurred in the jejunum or ileum. From these reports, it is easy to see that there is a wide variation in the frequency with which carcinoma of the small intestine is found.

D' Mlaines, in 1929, collected and reviewed 114 cases of primary carcinoma of the small intestine Twenty-six of these cases were From the Section on Surgery The Majo Clinic and The Department of Surgery The Majo Foundation Dr. Nettouri now resides in Mastin Minnesota

observed at The Mayo Chinic and were reported from a pathological standpoint by Craig Rankin and Mayo, in 1929, collected and reviewed 55 cases of verified primary carcinoma of the small intestine, including 24 cases which had been reported by Judd in 1010 In 1035, Plunkett, Foley, and Snell reported 14 additional cases To these, we wish to add 7 cases in which the diagnosis of carcinoma also was confirmed pathologically at operation or at necropsy This brings the number of cases of earcinoma of the small intestine, seen at the clinic prior to February 1. 1936, up to 76 We have found 60 other reported cases which bring the total cases in the literature to considerably more than 200 There is no obvious reason why earcinoma should be relatively rare in the small intestine



Fig 1 Obstruction in the jejunum which was interpreted as carcinoma (Case 29)



Fig 2 Carcinoma of jejunum (Case 20)

The numerous theories are interesting but far from conclusive. Ewing reported that 8 56 per cent of all intestinal carcinomas originated in the small intestine and that slightly more than half of these originated in the duodenum. In the cases of carcinoma of the small intestine which have been observed at the clinic the distribution is somewhat different.

In 31 cases the growth was situated in the pjunum in 21 cases it was in the duodenum and in 18 cases it was in the ileum. In 4 cases carcinoma was present in more than one portion of the small bowel and in 2 cases the site of the growth was indeterminate. We have reviewed the entire series of cases ob served at the clinic and are reporting the findings in the 31 cases of primary carcinoma of the jejunum. We have purposely omitted the cases in which carcinoma of the reunum.



Fig 3 Resected portion of jejunum in Case 30

was associated with carcinoma of the stomach, colon and genital tract and those cases in which carcinoma involved more than one portion of the small intestine. Those cases in which microscopic evaluation to receive the presence of argentaffin tumors (carcinods) also have been omitted. We believe that it is only in this fashion that the true clinical picture of carcinoma of the jejunum can be evaluated.

INCIDENCE ACCORDING TO AGE AND SEN

In this series of cases of carcinoma of the jeunum, 20 of the patients were men and 1 were women. The ages of the patients varied from 31 to 67 years. The average age of the men was 50 25 years and that of the women was 52 5 years. The average age of the entire group was 51 years. In approximately a third of the cases there was a history of carcinoma among some of the blood relytives of the present or preceding generation.

At the clinic, 2513 cases of carcinoma of the stomach, 2767 cases of careinoma of the colon, including the rectum, and 25 cases of carcinoma of the small intestine were observed from 1921 to 1930, inclusive In this same period in 8 of the cases of carcinoma of the small intestine the growths were situated in the lejunum. In this 10 year period 0 47 per cent of all gastro intestinal earcinomas involved the small intestine. This compares favorably with the incidence of 0 62 per cent reported by Rankin and Mayo in a similar series of cases In the 10 year period careinoma of the jejunum comprised o 15 per cent of the total number of careinomas of the gastro intestinal Seventy-six carcinomas of the small intestine have been observed at the elinic, these comprise o 62 per cent of all careinomas from the eardiae end of the stomach down to and including the rectum

SYMPTOMS

In Table I it may be seen that in about 80 per cent of the cases there was a rather typical ebnical history of a lesion of the small intes-This percentage undoubtedly was increased by carefully questioning the patient after the lesson had been discovered at the time of operation Such questioning often elicited a typical history Cramps and epigastrie discomfort are most commonly the chief symptoms Usually, there is a history of recurrent short episodes of intestinal obstruction, associated with cramps, nausea and vomiting These symptoms occur for 3 to 4 months and tend to become more frequent and more severe Although there is not always a relationship between the symptoms and meals. the cramps, when present, occur about 3 to 4 hours after eating 'Gas," "rumbling," and "bloating' are common symptoms

Weakness and easy fatigability are prominent symptoms and a careful history often reveals that these and anemia antedate the gastro-intestinal symptoms. Loss of weight is a prominent symptom and may cause the patient to seek medical advice. There is more constipation than usual and melena and hematemesis occur occasionally. The most important symptoms will be considered individually.

Colic Abdominal pain was an outstand symptom in 26 cases. It is difficult to evalu the short cramping type of pain and the m or less constant stationary type of pain, cause of the gradations present in both calized pain, which varied from dull to mod ately severe, was present in 6 cases, while patients complained only of abdominal tress or discomfort Abdominal eramps w the ehief symptoms in 17 cases. The site the pain was usually in the epigastrium be the umbilicus, which according to Riv corresponds to the site of referred pain eau by lesions in the jejunum Cramps, w present, were prominent in this region, as as across both lower quadrants of the almen There was extreme variation in duration of colic, which lasted from seve seconds to 3 or 4 hours

Anemia Fatigue, weakness, and genmalaise were constant but were frequer secondary to the gastro-intestinal sympto Frequently, there was a history of progress anemia which had not responded to treatm Laboratory tests showed the anemia to be the microcytie, hypochromic type average number of crythrocytes was 3,730, per cubic millimeter of blood. The m value for the hemoglobin was 59 per co Necropsy demonstrated that hemorrhage the cause of death in Case 12, which was only ease in which operation was not i formed Plunkett and his coworkers h pointed out that the anemia may result fi both the occult bleeding and the interfere of the absorptive function of the small in tine In 1913 and 1921, W J Mayo ca attention to the marked anemia associa with earcinoma of the proximal half of colon The marked anemia in these cases carcinoma of the jejunum is comparable the anemia associated with lesions of the ri half of the colon and may be attributable some change in intestinal absorption or 172 vation of the gastro intestinal hematory substance described by Castle and ot

Loss of weight Loss of weight occasil but 3 cases In 2 of the cases they was change in weight and in 1 there was 25 pounds (23 kilograms) The asymptotic was 25 pounds (113 kilograms)

Vomiting Vomiting was a variable symptom both in incidence and degree Frequently, vomiting was self induced to obtain relief While vomiting was more frequent when the upper portion of the jejunum was involved, this was not a constant finding since marked vomiting occurred in Case 23, in which the distal portion of the jejunum was involved, and there was an absence of vomiting in Case 11, in which there were several lesions in the proximal portion of the jejunum The degree of intestinal obstruction appeared to be the main factor in the production of vomiting There was no history of vomiting in 11 cases. the vomiting was slight or moderate in o cases marked in 9 cases and extreme in only 2 cases With few exceptions, it was intermittent and followed the other obstructive symptoms

Constipation In several cases, constipation was one of the cluef complaints but it was a minor symptom in many cases. Constipation was present in more than half of the cases (17) but it never was intractable. Moreover, 6 patients gave n definite bistory of diarribea, most commonly a mild diarribea which alternated with periods of constipation or normal bowel movements. Constipation, while a common symptom, is too variable to be of

diagnostic vilue

Melena While melena was not a frequent complaint, it occurred in 6 cases

SPECIAL TESTS

Occuit blood The presence of occult hlood in the stool is a very valuable sign and the test should be used more frequently than it is By this test the careful chinician often othans the first clew as to the real nature of the patient's trouble. It is striking to note that strongly positive reactions were obtained in all cases in which the occult blood test was employed.

Gasfrie analysis Gastrie analysis was made retention which varied from 370 to 1000 cubic centimeters. Hyperchlorhydria was present in only 1 case, in which the value for the total acid in the stomach was 70, according to the method of Toepfer. Achlorhydria was present in 12 cases.

ROENTGENOLOGICAL EXAMINATION

The decision as to whether roentgenological examination should be carried out must neces sarrly be hased on the clinical findings. The symptoms of previous attacks are frequently so suggestive of intestinal obstruction that the use of barrum (especially by mouth) is not only of little aid but may constitute a definite hazard Roentgenological examination with a contrast medium has been very useful in demonstrating the absence of lesions of the stomach, small intestine, and colon in cases in which there are present vague, indefinite, gastro intestinal symptoms and in cases of unexplained anemia. A positive roentgeno logical diagnosis was made in 10 cases (Cases 6, 7, 14 22, 23, 24, 27, 28, 29, and 31) Gabor and Hiller bave pointed out that retention of barium in the small intestine for more than 8 hours should arouse suspicion

The roentgenogram of carcinoma of the jejunium reveals a narrowing of the intestinal lumen at the site of the lesion and compen satory widening proximal to the obstruction Coiling of the intestinal loops proximal to the lesion and distention are frequent findings.

The observation of barium in the small in testine is rather difficult, but the clinical history and the roentgen exclusion of the presence of a lesson in the stomach or colon frequently will furnish presumptive evidence of a lesson of the small intestine. In Cases 27 and 28, vray examination of the colon revealed the presence of an extraisic mass suggestive of a neoplasm of the small intestine.

Figure 1 shows a jegunal tumor which has produced partial obstruction of the intestine The Instory in this case (Case 29) was rather indefinite, but the patient had had severe cramps and had noted distention and rum bling in the abdomen. The lesion which was found at operation is shown in Figure 2. The patient had undergone a cholocystectomy a short time hefore she came to the climic A previous roentgenological examination of the intestine, which had been made prior to her admission to the climic, had not revealed any almormality.

DIAGNOSIS

It is neither important nor possible clinically to differentiate carcinoma of the jejunum

TABLL I -- CLINICAL DATA IN 31 CASES OF CARCINOMA OF THE JI JUNUM

		TABLL I CI	INIC	AL I	DATA	IN 31	CASES	OI	CA	KCINUMI	Of IIII JEJONOS	-
				4	Blood Gastr acidit		tric ty*					
Case Year abserved	Age - sers	Principal symptoms	Pounds lost	Duration of symp- toms months	Hemoglobin per cent	Erythrocytes thousands per cu min	Leucocytes per cu mm	Total	Free	Site of Jesion	Operative and patho- logic findings	Outcome
	39 14	Gas rumbling gramps	50	3				25	0	Upper part of jejunum	Obstruction carcinoma	Died in 11 months
1907	40 M	Epigastrie pain,	25	3	50	4 53	6 800		_	Upper part	Obstruction, ascites metastasis	Unknown
1909	49	Cramps rumbling	12	2),	55					Upper part of Jelunum	Obstruction, peritoneal anodules	Died in 4 months
4	46	Cramps vomiting	20	36	30	3 34	2 000	48	•	Upper part of jejunum	Large tumor metastasis	Died in 6 months
1911 5 1913	11	Cramps vomiting	54	10	·			50	40	Upper part	Ring enreinoma metastasis	Dierlin 22 months
6	\$?	Alternating con stipution and diarrhea vomiting	23	,	-			45	40	Upper part of jejunum	"Spool sized carcinoma	Died in 12 days
7	Ñ.	Fuliness distress	40	6	80	4 03	8 800	36	22	Upper part of jejunum	Obstruction no metastasia	Died in ot montils
1016	#	Epigastric mass rumbling pain	6	•	1-	1-				Upper part of jejunum	Obstruction metastasis	Died in 3 days
1016	45	Pain, vomitiog	20	4			\$1 200	<u> </u>	_	Middle of fejunum	Obstruction carcinoma grade 4	Died in 14 months
10	65 M	Cramps gurgling	85	24	82		7 000	-		Middle of Jejunum	Obstruction ascites metastasis	Died in 19 montin
11 1918	47	Cramps loss of weight	20	2/2	74			36	30	Upper part of Jejunum	Obstruction three epitheliomas metastasis	Died in 4 months
1918	15	Cramps meleoa fever	10	1	25	2 06	27 000			Upper part of jejuoum	No operation ulcera tion obstruction metastasis	Die 16 days after admission to elinic neers pay
13	Š	Pain vomiting	20	12	77		\$1 200	48	25	Middle of Jejunum	Obstruction metastasis	Died in 1 month
14	61	Voruting distress	20	3	68	3 30	8 70	1	Γ	Upper part of jelanum	Obstruction metastasis adenocarcinoma	Died in 2 month
15	67		•	9	36	3 10	6 000	72	·	Distal part of jesunum	Obstruction annular adenocarcinoma	Died in 12 months
101	43		24	8	42	3 42	9 500	28	٥	Upper part of jejunum	Slight obstruction metastasia	Died in 3 months
17	61		40	4	45	3 85	4 650	12	°	Mid	Obstruction annular adenocateunoma	Died in 8 days
101	10		12	12	75	4 54	9 300	1	1	Upper part of jejunum	Obstruction colloid carcinoma metastasis	Died in 11
10	33	Anemia, cramps vomiting	°	24	18	3 17	6 *00	94	70	Opper part of jejunum	Obstruction adeno- carcinoma grade 2	Alive
192	5	Distress cramps melena	11	6	34	3 18	10 600	10	1.	Upper part of jejunum	Obstruction carcinoms grade 4 metastasis	Mive
102		Vomiting	24	2,13	73	4 91		32	"	of jejunum	metastasis	Died in 13 months
193	ւյն		36	5	71	4 32	9 800	L	L	Upper part of jejunum	Obstruction carcinoma grade 5 metastasis	Died in 255 months
23 193	. 1		30	7	71	490	6 800	20	°	Lower part of jejunum	grade 2	Died in 25 months
10	2 4		48	5	97	4 50	17 200	18	J.º	Upper part of jejunum		Died in 3 days
10	2 3		15	9	37	3 71	7 200	_		Јејшпит	Perforation obstruction	Died in 11 months
10	3 2	Constipation dull pain snerms		24	49	3 92	10 300	_	-	of jejunum		
19	11.		52	45	50	3 83	7 900	30			Obstrucțion metastasis adenocarcinoma grade	
19	14]]	o Colici cramps anemia	10	7.0	51	3 13	8 600	20	L°	of jepinua		Died in 14 days
10		F tion cramps	24	1	91		9 100	_	L	Upper part of jejunun	carcinoma grade 2	Died in 9 days
19	35	Cramps anemia melena	5	2	82	4 01	3 600	50	Ľ	of jejunun	Aunular ulcerating a denocarcinoma grade	
10	5	Cramps loss of weight melena	37] *	70	2 63	3 800	1"	,] ,	Upper part of jejunun	Metastasis adenocar cinoma grade 3	Alive
*According to method of Toepler												

and carcinoma of the lower portion of the duodenum or ileum. In a large percentage of cases, symptoms of intermittent intestinal obstruction, symptoms referable to anemia, and additional laboratory tests have been a great aid in the diagnosis of caranoma of the small intestine in recent years. A positive test for occult blood is a very important finding.

At the age at which cancer occurs, other diseases are often present, which may not only confuse and distort the clinical picture but also may mislead the surgeon unless a careful exploration is performed. In 5 of the cases in this series (Cases 17, 21, 23, 26, and 29) there had been typical attacks of cholecystitis and gall stones were found to be present at opera tion In Cases 2 and 30 (Fig 3) the patients had duodenal ulcers, and in Case 16 a gastro enterostomy bad been performed previously for a duodenal ulcer, and a nb had been resected because of pneumococcic empyema A sixth of the patients had been treated pre viously for anemia, but improvement had not occurred Diverticulitis migraine adenomat ous gotter and tuberculous scoliosis also were found in some of the other cases of carcinoma of the jejunum included in this report

SURGICAL TREATMENT

These cases represent the experences of 16 surgeons. Resection and entero anastomosis were the procedures of choice and could be performed in 15 (48 per cent) of the cases. Of the palliative surgical procedures, entero anastomosis was performed in 11 (35 per cent) of the cases, while gastro enterostomy was performed in only 2 cases. In 2 cases the abdomen was closed after an exploratory laparotomy, and in 1 cases no surgical treat ment was given. A detailed description of the surgical technique has been reported previously by one of us (Vlayo)

PATHOLOGICAL CHANGES

The typical tumor is an annular, obstruct ing adenocarcinoma similar to that found so commonly in the distal portion of the colon Polyps, which were undergoing malignant de generation, occasionally were found A detailed description of the pathological changes in these cases will be reported at a later date. The lesson was situated in the upper part of the jejunum in 22 of the cases and in a surprisingly large number of cases it was situated at or within a sbort distance of the ligament of Treitz. In 4 cases the lessons were situated in the middle portion of the jejunum and in 3 cases they were in the distal portion of the jejunum. In 2 cases the situation of the lesson in the jejunum was not described in the jejunum was not described.

Metastasis Vectastassis is a common accompamment of malignancy in the small intestine Metastastic invasion first occurs in the mesentenc lymph nodes and pentoneum, then in the liver, lungs, long bones, and dura mater of the spinal cord, in the order named Metastasis takes place probably at an early stage and obviously influences seriously the undesirable outlook of lesions in this situation. In a study of 12 cases of jejunal carcinoma Craig found metastasis in all but it case. In more than half of the 32 cases which form the hasis of this report, demonstrable metastasis was reported by the surgeon or the pathologist.

PROGNOSIS

The prognosis of carcinoma of the jejunum, like the prognosis of carcinoma in other parts of the small intestine is unsatisfactory, re gardless of whether or not the growth can be removed To get a general picture of the prognosis the patients have been divided into two groups. The first group, which includes those patients who are living at the present tune, consists of only 4 patients However, 2 of these have lived more than 7 years from the time of operation. In considering the small number of patients who are alive, it should be remembered that the cases have heen observed in the course of a creat many years In the second group, in which the prognosis is less favorable, only 2 patients lived more than 3 years since the operation One of these patients (the patient in Case 7) lived for more than 7 years after the operation and the other patient (the patient in Case 10), who was subjected to a palliative jejuno sesumostomy, lived in comfort for almost 6 years since the operation The average length of life for the second group of patients was 176 months Although the patients haed

only a short time, the relief of obstruction and the comfort of the patients seemed to justify the surgical procedures Perhaps the digestive activity of the jejunum, the abundant supply of lymph, and the high grade of malignancy are important factors in the gravity of the prognosis

CONCLUSIONS

1 Carcinoma of the small intestme is infrequent and comprises 0 47 per cent of carcinomas of the gastro-intestinal tract

2 The session is the most common site for carcinoma of the small intestine, and carcinoma of this region represents 0 15 per cent of all gastro-intestinal carcinomas

a Intermittent attacks of intestinal obstruction with progressive anemia, in the presence of normal roentgenograms of the stomach and colon, should suggest primary malignant disease of the small intestine

4 The presence of occult blood in the stool appears to be a rather constant finding and the occult blood test should be performed in every case in which there is vague abdominal pain

5 This condition must be kept in mind in any case of unexplained anemia

6 The operative mortality of carcinoma of the jejunum is 20 per cent, while the average duration of life is 17 6 months following operation

7 The comfort of the patient justifies the surgical relief of obstruction in the jejunum

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THE EFFECT OF THROMBOPHLEBITIS ON THE VENOUS VALVE

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OTH the pathology and the clinical course of phlebitis might lead one to expect that this disease process should involve the venous valve. It seemed to the authors that the organization of a thrombus must effect some changes in the thin valve flap that hes buried within it Chinically, we sought in such valve damage the answer to the permanent disability of the post phlebitic limb (phlebitis of the deep sems) Such disability, manifested by cyano sis, edema, and easy fatigue, may indeed occur and persist even after an adequate lu men is established by recanalization, and even after accompanying varicosities (if they exist) have been cured by ligation and injection This suspicion of valve damage was strength ened by our observation that varices of the leg may increase in sevents if a previously well valved saphenous vein were referesed by insection. After such treatment, either recanalization of the saphenous or dilatation of collaterals may occur (3), and one frequently finds a quickly developing reflux of blood in the veins. In other words one bas brought about, or hastened the valvular incompetence of the trunk that feeds the varices. Still one more observation suggested the thesis of valve damage Varicose ulcers occurring after phiebitis of the deep veins are especially stub born and are usually accompanied by incompetence of the valves of the perforating veins This situation was discerned by Homans, who in 1016 wrote "In this case the valves are suddenly and universally crippled possibly by the organization of the thrombus

We have been able to find only one direct observation of the venous valve after phlebatis. Bencke (1800) in discussing organization from the Surgual Research Laborator. The Source City Despite the Department of Surgery Parts Collect Belgical City Hospital of the Department of Surgery Parts Collect Belgical City Hospital Algebras parasi from the Charliera Keenach Fund. Read below The her England Heart Source; Boshon, Mana

chusetts, December 14 1936

of thrombi, stated that where a thrombus of erlays a normal valve, no organization proceeds from the free part of the valve cusp "But if the valve be fixed in any way, as by adhesion to a previously organized thrombus

a true organization can proceed from the

We have not been able to find descriptions the actual events during the actual events during the active phlebi its It is interesting, however, to note the description of the destruction of an analogous structure, the lymphatic valve, by Benda (1911) In describing the course of tubercu loss of the thorace duct, he writes "The ulceration frequently attacks the valves, and disrupts them into small fragments. The changes are so severe as to make most of the valve disappear." He published a drawing showing the microscopic appearance of the fragmented elastica of the valve lying within the thinn and caseous tissue.

Because of the paucity of previous observa tons we thought it fitting to study the actual histology of the venous valve during the entire course of philebits. This paper is a report of this study. The material is partly from the bu man, and partly from dogs. In the latter aphile bits was produced by chemical irritation of the femoral ven.

METROD OF STUDY

Sixteen dogs were used for the study of the artificially induced phlebits. Each femoral term was operated on twice, the phlebits was produced at the first operation, and the segment of vein containing the valle was excised for examination at the second. The interval between the production of the phlebits and the excision of the vein varied with each dog, so that the process could be followed through its various stages.

To produce the phlebitis at a valve site, the femoral vem was isolated in the trigone. Here, just below the entrance of the deep femoral vein, there is constantly a valve, and in some cases a second one a few millimeters lower When the vein is stripped free of its sheath, the attachment of the two cusps (the valve is usually bicuspid) is seen as two crescentic, transverse, opaque white ridges, an appearance that we may call the valvular arcade In order to be sure of including the valve in the future excision, this area containing the valve was demarcated at the very start, since the onset of the phlehitis rendered it impossible to see the arcade at any later time Accordingly, sutures of heavy linen were placed in the muscle medial to the vein, one above the arcade and one below, demarcating a piece of vein about 15 centimeters long The ends of the sutures were left long and were easily found at the second operation One or two small tributanes which entered the vein were cut between double ties

The segment of vein was isolated by gentle clamping above and below, and was injected with a few drops of sodium morrhuate 1 The vein was flushed out with the sodium morrhuate, and then a little blood was allowed to enter it. We found that leaving in any more of the material diluted the blood to such an extent that the clot was too soft to remain after removal of the clamps. At the beginning of the study a 5 per cent solution was used, which produced only a partial throm bosis We later changed to a 10 per cent solution, which gave a complete thrombosis The clamps were left on for 40 to 90 minutes, in order to ensure a good clot, and then re moved The wound was closed by sutures

At the second operation the demarcated segment of vein was laid bare. We wished all the microscopic sections to be cut uniformly in a longitudinal direction and perpendicular to the plane of the cusps, as in Figure 1 This was accomplished by heeding the orientation of the cusps to surface planes as established in a previous study (4) To ensure this proper orientation, the anterior surface of the vein was marked with ink as soon as the vein was exposed The demarcated segment was then excised

Only one human specimen was artificially produced (Figs 13, 15) In this instance, a

Supplied by Searle & Co

good valve was demonstrated in the saphenous in the leg and demarcated by a silver nitrate stain on the skin The vein was then injected with sodium morrhuate, and this segment of the thrombosed vein was removed 10 weeks later All the other human veins studied were from patients with spontaneous phlebitis Some of the specimens were obtained at operation, the others at autopsy These human specimens could not of course be placed in a chronological sequence as accurately as the dog vems

While in the case of the years of the dogs, the placing of the demarcation sutures left no doubt that the sectioned vein had previously contained a valve, yet the actual identification of the cusps was difficult within the mass of elot and organization This was even more true in the human veins. The use of Verhoeff's elastic tissue stain finally proved that the given segment of vein contained, or had contained, a valve The valve cusps contain a fine membrane of clastic tissue beneath their contact surfaces This elastic tissue, when stained, shows up well within the organizing thrombus Counterstaining with van Gieson's stain further allowed a differentiation of the old collagen of the valve from the new fibroblastic tissue 2

COMPLETE THROMBOSIS

For purposes of clarity we describe the changes under the following beadings

- r Mobilization of the organizing elements
- 2 Fibroblastic proliferation
- 3 Fragmentation of the valve cusps
- 4 Recanalization

I Mobilization of the organizing elements The most prominent changes, in this stage, occur at the junction of the cusp and the vein wall, a region which we may call the valve base Here there is normally a capillary which is small and hardly discernible. With the advent of the irritant responsible for the phlebitis, as well as the irritation of the clot, there comes about a dilatation and branching of this capillary The vessel becomes really sizable and its branches are traceable into the cusp proper (Figs 3, 11) In some instances the irritation caused a diapedesis of red cells or an actual rupture of the capillaries in the cusp, with bemorrhage. This was visible in the bland thromboses of the human and dog specimens, but was most marked in a case of in fected philobitis in a dog.

The passage of the dilated and new capil laries across the base deserves closer examina tion (Fig. 10) The junction of the elastic laming of cusp and vein wall is in the shape of a Y As one follows the well formed sheet of elastic tissue of the cusp to its lateral ex tremity, it can be seen to course distally in a curve to run without interruption into the in ternal elastic lamina of the wall Proximally, however, in the region of the angle the ninction of the two elastic membranes has a differ ent appearance. Here the elastica of the vein wall is more abruptly attached to the elastica of the cusp, this union not being effected by a single membrane but rather by a coarse network of elastic tissue

The capillary of the valve is located closer to this pro-unal junction of the elastic tissue to that pro-unal junction of the elastic tissue to the distal more solid part. When the capillary proliferates the path of its branches lies directly across the network of elastic tissue. This tissue is thereby broken up further and thus allows the passage across it of the capillaries as well as of lymphocytes mac ropbages, and fibroblasts (Figs. 3, 10, 11). The distal portion of the elastic junction seems to form a better barner and is disrupted to a lesser degree.

2 Pibroblastic proliferation At the same carly stage to which the mobilization process pertains, fibroblastic proliferation and organization of the clot has already begun The carliest appearance of the fibroblasts, and consequent deposit of collagen is seen in the angle of the valve sums and this may well be due to the ease and rapidity with which the capil larnes described above can reach it? The or ganizing tissue fills the angle immediately binding the profund part of the cusp to the cein wall. As the organization progresses, it soon fills the entire sinus, causing adhesion of the entire length of the cusp (Figs. 3, 10, 11).

The fibroblasts are at first less plentiful

Beneke used this localizat on of ea lest organization to strengthen bla
argument that the biroblasts of almo earlest who e there is most re
sistance to the pull of force earted by a stank an et nombre

along the contact surface of the cusp, but nevertheless, do cover it. The cusp is thus very soon completely imbedded in the young, vascular connective tissue. During the clot ting of the blood the valve may have become considerably kinked and folded. The subsequent contraction of the fibroblasts increases this distortion and causes an adhesion of the folds to each other (Figs. 5 and 12). The cusps is thus shortened (Fig. 10). If the cusps hap pen to be closs to each other at the moment of clotting, then the fibroblasts along their contact surfaces will cause them to adhere to each other.

The new connective tissue, originally made up of fibroblasts, becomes more persistent with the production finally, of collagen This material is distinguishable in many of the older specimens, through the use of van Gieson's stain, and Mallory's connective its sue stain

3 Fragmentation of the alreausps. All the changes incident to phlebitis focus on this one practical point, the destruction of the valve cusp. The valve collagen is least resistant to the lytic forces and disappears first but the elastic tissue is tough and can be followed, even though it be in fragments to the very end of the metamorphosis of the thrombus.

The quickest lives is by ulceration, a process which is seen only in septic philebits (Fig. 4). In ordinary bland philebits, the earliest disruption is that already described at the base At this same time, the cup may be torn by hemorrhage from its capillaries, as noted in the previous section.

As soon as fibroblasts and capillaries sur round the valve, the cusp is progressively fragmented by these two elements. We do not know exactly how or when the endothelum of the cusp disappears, but the fibroblasts and capillaries are seen in contact with its bare connective tissue and penetrating into it (Fig. 12). The collagen is seen as small masses of pale staining material but the elastic tissue can be followed as small sheets which later may also be broken up into small frayed hits

At this stage the continued growth of the capillaries furnishes a continuing progres sively stronger disrupting force which will be considered under the next heading A Recandization The organization of any sizable thrombus is always associated with a vascularization of the organizing connective tissue. It is rare, indeed, not to find that many of the vessels have a connection beyond the ends of the thrombus, bridging across from one open part of the vein to the other. And, therefore, while clinically we may speak of the presence or absence of recanalization in a thrombosed vein, we really mean to distinguish between a grossly visible lumen and microscopic channels.

Studying the organizing thrombus, one sees the capillaries develop pari passu with the fibroblasts (Tig 12). By the time the fragmentation has been rendered quite complete, the capillaries have fused into sizable communicating channels. In so doing they push aside both the organized thrombus and valve

fragments

The vein, at the valve site, assumes an appearance which differs not at all from the thrombosed vein at any non-valved part (Fig. 13) The vein wall is thickened by the addition of fibroblastic tissue, and its lumen is crossed by columns of the tissue, separated by the endothelium-lined clefts These columns gradually become thinner by virtue of the shrinkage of the maturing connective tissue, and by the corresponding increase in size of the intercommunicating blood channels Staining for elastic tissue demonstrates this material of valvular origin, lying within the connective tissue strands (Figs 6, 7, and 8) This finding demonstrates conclusively that the segment of vein under scrutiny is actually one which previously contained a valve, for the valve cusps are the only available intramural source of this material. New elastic tissue does, indeed, form in the connective tissue, but only after many weeks, and then it is very much finer in texture and paler in staining quality

The end result of the recanalization is the production of a valveless single lumen in the vessel. The lumen, as noted, may be large and therefore clinically important,—or small, and recognizable only by microscopic examination. In those instances in which the valve has very early become adherent to the vein wall, the vessels may more easily traverse the thrombus.



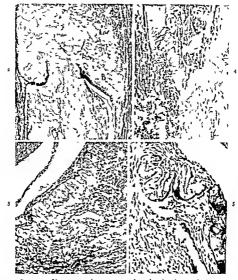
Fig 1 The human venous valve in fresh, unshrunken condition, longitudinal section S, Sinus, A, angle, B, base, C cusp (contact surface) (From Surg, Gynec & Obst, 1934, 59, 916)

and may not break the valve up so completely. In such a case, a sizable sheet of its elastic tissue may be found in the thickened intima, lying parallel to the older vein wall (Fig 6)

INCOMPLETE OR PARIETAL THROMPOSIS

Several examples were obtained of the effect of parietal thrombosis on the valve, although we did not demonstrate the sequence in as much detail as in the case of complete thrombosis. The early changes are very similar to those in complete thrombosis, the valve base shows the same dilatation and proliferation of the capillaries and splitting of the junction of the elastica.

The sinus is apit to be well filled with clot from the start. Organization here produces a pad of tissue which narrows the lumen of the vessel (Fig. 14). The cusp will be adherent to this connective tissue for a variable distance, from the angle to its free edge, and indeed may be quite lost within this new intima (Fig. 9). Laterally, in the commissure of the valve, the cusps may become adherent to each other by interposition of fibroblastic tissue (Fig. 14).



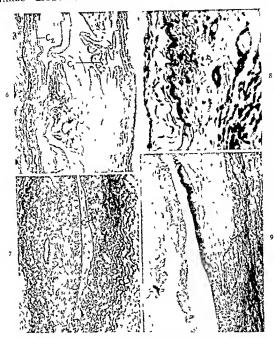
Figs 2 to 5 I hotomicrographs in experimental complete thrombosis in the dog Fig 2 A longitudinal section of a femoral vein showing both valve cusps in the organizing thrombus 7 days X17

Fig. 3. The detail of the salve base at B of the perceding agure. New capillanes cross the 1 junction of the elastica. The contact surface of the cu. p is rovered by a timilaryer of organized thrombus next to a still induct elastica. The angles selled with vascular connective tissue building, the cusp to the veni wall. The fibrioblastic enter into crevies of the cusp. Xiro.

Fig. 4. Septic phlebitis. There is ulceration of the valve base. 6 days. $\times t_{45}$. Fig. 5. The free edge of a cusp which has folded on itself and become surrounded by the connective itssue of the thrombus. 8 days. $\times t_{45}$.

In addition to the possibilities of adhesion the cusp is subjected to further change by the growth of fibroblasts more generally over its two surfaces. Through the addition of this tissue the cusp becomes thickened, and there fore more or less rigid, and through the con

traction of this tissue it becomes kinked and shortened so that it meets its fellow with difficulty or not at all. Such a cusp projecting rigidly into the lumen will hinder the centified flow of blood and will be more or less ineffectual in preventing back flow. It can



Figs. 6-7 and 8, Photomicrographs in experimental complete and Fig. 9 incomplete thrombosis in the dog

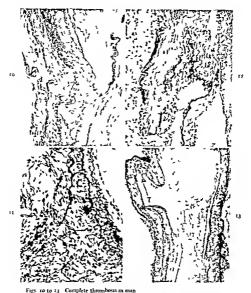
Fig. 6. Recanalization has broken up the thrombus, leaving trabecube crossing the lumen. In one of these at C₁ is a small piece of elastic tissue, a remmant of the previously cristing value. 4 C₁ is a longer strip representing the second cusp. The dark areas in the heavier trabecule below are nuclei in the newly formed connective tissue, and pigment in macrophages 4 months, X21.

Fig. 7 Further recanalization has resulted in a single, narrow lumen. The vein is now valveless. 7½ months, X37.
Fig. 8 Detail at area C of the vein shown in Figure 7. There is still evidence of a

Fig. 8. Detail at area C of the vein shown in Figure 7. There is still evidence of a previously evisting value cusp in the shared of elastic tissue buried in this thickneed in tima \$\times\$ 250. Fig. 9. The cusp is adherent to the vein wall by connective tissue which lies along

Fig 9 The cusp is adherent to the vein wall by connective tissue which hes along the whole of its sinus surface. Its free edge is thickened and kinked by this tissue 13½ neeks ×45

therefore be said to exhibit stenosis and insufficiency comparable to that shown by the mitral valve (Figs. 15, 16) As in complete thrombosis, the cusp will be less disrupted if it lies laterally (open) at the moment of thrombosis, and in this position

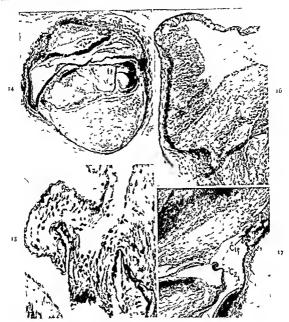


his to Fermoral vieta longitudinal section. The cut p lies imbedded in the organizing thrombus. The times is filled with naturing connective tissue which effects a herence of the cut p to the wall. There is some kinking of the cut'p maintained by the new tissue as well as shortening, which is evidenced by wrankling of the elastica in its mid portion. X11

Fig 11 Detail at valve base of an iliac vein cross ection. The structure is disrupted by newly formed capillaires lymphocytes, and fabroblasts. X165

Fig. 1. Detail of the final portion of the same en p bona in Figure 1. The cup is wrinkled and folded on itself this distortion being maintained by fibribilities. In some areas capillaries and fibribilities capit creatives the tissue of the cup Σ too Fig. 13. Complete thrombosis of a suphemous even and momplete thrombosis of its tributary artificially induced 10 weeks. The main vina bows the enlargement of the value samues but the co-p have been destrowed. Under higher magnination some of the value of the value can be found at areas sudcated i. The value of the tributary T is movibed in an incomplete thrombosis Σ to S

may become imbedded within the new thick intima or adherent to it (Fig. 9) When a vein is completely thrombosed, its inbutance may exhibit a parietal thrombosis



Figs 14 to 17 Incomplete thrombosis in man

Fig 14 Femoral vein cross section The larger sinus is completely filled with clot, more than half of which is organized. When it is all organized, it will make perminent the binding of the valve to the vein wall. The other sinus is less completely filled with organized thrombus, but enough to limit the lateral excursion of the cusp. This cusp is further hamnered in its movement first by a thickening due to the organization of the thrombus along its contact surfaces, and second by inter adhesions between it and its fellow at one commissure Not only is this valve completely hampered in its closure (in sufficiency) hut as the cusps are projected rigidly into the tumen, they seriously ob-struct the flow of blood (stenosis). This stenosis is further augmented by the adhesions between the two cusps X13

Fig 15 One cusp from the tubutary of the vein shown in Figure 13. The cusp is thickened by the addition of fibroblasts. It also presents a kinking and shortening,

maintained by these cells X235
Fig 16 One cusp from a saphenous vein (operative specimen) The structure is thickened and shortened by the addition of connective tissue especially on its sinus side Here the connective tissue effects an adhesion of cusp to wall Compare thickness of proumal half of cusp to that of terminal uninvolved portion \$76

Fig. 17. A special variety of incomplete thrombosis, the valve of a vein tributary to a completely thrombosed femoral vein. The intima of the tributary is thickened. Both cusps are caught in the organizing thromhus of the parent trunk. Cusp C_1 , is entirely incorporated in new tissue, C_2 , pulled back by adhesion of free edge $\times 215$

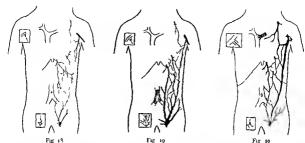


Fig. 18. Normal venous drainage of the anierior wall of the trunk. The inserts in the rectangles indicate the direction of the blood flow above, and below the umbifues. This direction of flow is ensured by the presence of valves in these vein.

I ig 10 The direction of senous flow when the seins of the trunk act as collaterals in obstruction of the inferior

The cusps at the mouths of such tributanes may be involved in such abroblastic adhesions as have already been described. They may, however show a special form of crippling due to their being caught in the thrombus of the parent trunk. The entire cusp may thus be caught and will go through the same destructive process as any cusp lying within a complete thrombus. A variation of this process is the adhesion of only the free edge of the cusp to the thrombus of the parent trunk. The section of such a valve shows its cusps pulled far back from the vus of the lumen in such a way as to render the valve absolutely useless

Occasionally only one cusp is thus caught while the second may be free. The end stage of such a process is the functional disappearance of one cusp with a resulting incompetence.

(Fig 17)

THE VALVES OF THE COMPENSATORY COLLATERALS

In the preceding discussion it has been stated that some recanalization always occurs although in some cases it results in only a microscopic lumen in the phlebitic vein. Such

vens cava or its main tributaries. The flow takes place against the direction of the valves in the lower vens. Fig. so The direction of venous flow when the vens of the trunk act as collaterals in obstruction of the superior vens cava or its main tributaries. The flow takes place against the direction of the valves in the apply vens. This

is made possible by an insufficiency of these valves

a lumen is inadequate and the blood in its return to the heart must pass through the nor mal collaterals. These collaterals, specially when they are few in number are forcid to dilate to accommodate a larger volume of blood than they normally carry. When they are deeply placed, these compensators collaterals are supported by the deep fascia, and dilate only enough to handle their increased blood content.

In a previous work (5) the length of the valve cusp that is actually in contact with its fellow was measured, and found to be from 0.2 to 0.5 of the diameter of the vein as muss ured across its center at right angles to the cusps. Taking into account the fact that there are two cusps, it is seen that they can not meet, as soon as the vein has diluted an equivalent to from 0.4 to the whole of the original diameter (fig. 1).

If we consider that the deep collaterals, when they are compensatorily dilated, meas ure two or more times their original diameter, then it is evident that the valves of such collaterals are incompetent. This is analogous to incompetency of an aortic valve when

syphilis causes a dilatation of the aortic ring The superficial compensatory collaterals are not supported by a firm fascia and dilate beyond their needs for blood carrying. In superficial collaterals, therefore, the valvular incompetence is apt to be even more marked than in the deep vens

This valvular incompetence is evident on inspection of the veins lying on the anterior wall of the trunk, when they are dilated compensatory to a phlebitis of a vent cava, or a femoral or that vein These superficial veins are divisible into two groups (Fig. 18) those above the umbilicus, which drain into tributaries of the superior vena cava via the internal mammary, intercostal, and long thoracic veins, and those below the umbilious, which drain into the tributaries of the inferior vena cava via the superficial epigastric, circumfley iliac, and pudendal tributaries of the saphenous vein These two sets of veins are sup plied with valves which direct the blood coming from below the umbilicus downward, into the upper end of the saphenous vein, and the blood from above the umbilicus upward, into the veins tributary to the superior cava

Whenever there occurs a thrombosis of the inferior cava, or the iliac or femoral veins, with inadequate recanalization, these surface veins dilate, and act as compensatory collaterals. The ability of these veins to act thus depends upon a preliminary dilatation of the vein, with a resultant valvular incompetence, for the blood in the inferior group of veins must now run upward against the direction of the valves This reversal of blood flow does. indeed, take place (3), and it can be demonstrated by inspection or by roentgen ray visualization (Fig. 19) An analogous situation obtains when there has been obstruction to the superior vena cava or its tributaries (Fig. 20)

On the few occasions when we have been able to eximine such collaterals at operation or postmortem, we have not been able to locate the valves of these veins. They evidently undergo a process of degeneration, the mechanism of which we are not ready to explain

Mechally the para umbilical terms and laterally the lumbar sense emistitute a lititional potential channels

SUMMARY AND CONCLUSIONS

Phlebitis, with the organization and recanalization of its attendant thrombosis, has a profound effect on the valves of the involved vens.

Complete thrombosis produces, actually or functionally, a valveless vein cusp be projecting into the lumen (closed position) at the time thrombosis occurs, it hes in the very center of the organization process Here it is a passive structure, fragmented by hemorrhage and inflammatory exudate, made adherent to the vein wall at the sinus. and to its own folds and to its fellow cusp, and traversed by capillaries and fibroblasts organization proceeds, the capillaries widen and coalesce, constantly increasing the fragmentation of the cusp By the time the capillaries have formed sizable channels, the cusp is no longer existent. Only fragments of its clastic tissue can be found in the trabeculæ which separate the lumina When, finally, there is produced a single lumen, only occasional traces of this elastic tissue can be found in the irregularly thickened intima, to mark the site where the valve previously existed

Should the cusp be next the wall at the moment of thrombosis (open position) the earliest organization binds it to the intima. Here the later changes of organization and recanalization disrupt it less than in the former case. But this vein is functionally just as valveless, since the cusp can no longer project into the lumen.

In the case of incomplete, or mural throm bosis, there may result changes in the cusps, comparable to stenosis and insufficiency seen in the heart valves. Fragmentation of the cusp is minimal and usually limited to the base. More important, however, is the addition to the cusp of new connective tissue, which binds its proximal part to the vein wall, and thickens and shortens it along some, or all of its length.

Stenosis may also be occasioned by the organization of the thrombus in the valve sinus, producing a pad of tissue which does not allow the cusp to open widely

As in complete thrombosis, the cusp may be rendered functionless by adhesion of its entire length to the vein wall

A special form of adhesion with resultant insufficiency is seen in the valve guarding a tributary, which leads into a vein undergoing complete thrombosis In this case one or both cusps may be caught in the thrombus of the main trunk, by the free edge or in the entire length The organization will destroy these cusps, or pull them far apart and maintain them in a constant open position. Such a condition is exemplified in the valves of the perforating veins of the leg when a thrombus involves the deep veins

When recanalization does not proceed sufficiently to form an adequate lumen, the col lateral veins dilate to take over the blood flow Such dilatation produces a necessary insufficiency of the valves of these collaterals This is exemplified in the veins of the trunk when there is an occlusion of either vena cava

We feel that in these studies we have found at least one of the reasons which is reponsible for the poor venous circulation which follows phlebitis

It is a pleasure to acknowledge the help and advice given us in this tudy by Dr Frederic Parker Ir

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SKIN HYPERESTHESIA IN ACUTE SALPINGITIS

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KIN hyperesthesia has been almost entirely neglected in gynecology. Skin sensitiveness is known to occur in acute inflammations of some of the abdormal organs, notably the appendix and gall bladder. It is reasonable to assume that hyperalgesia may be associated with acute inflammations of the fallopian tubes also. Ac cordingly, a large series of cases of acute salpingitis, as well as other pathological conditions of the internal female organs have been studied to determine the frequency and exact distribution of skin hyperesthesia.

A review of the literature readily discloses the meager knowledge concerning the occurrence of skin hyperesthesia in diseases of the female internal genitalia Robinson (1008) cities 4 cases of salpingitis and pyosalpiny and a case of ruptured ectopic gestation which failed to show skin hyperalgesia Cope (1924) presents 4 cases of salpingitis associated with a "certain amount of pelvic peritonitis." 2 of which showed skin hyperesthesia. Two cases of inflamed ovarian cysts also reported by Cope showed a "small area of hyperesthesia" Livingston (1032) reports having observed 4 cases of acute tubal conditions with definite hyperalgesia Pottenger (1922), in his text Symptoms of Visceral Disease merely mentions that the skin may become sensitive in some affections of the ovary Sherren (1003) and Ligat (1010) in their observations on cutaneous hyperestbesia fail to mention any pathological condition of the female genitalia which may show changes in skin sensitivity

The paucity of observations on skin hyperesthesia in affections of the female pelvic organs is apparent. Obviously many errors are still made in differentiating acute inflammatory conditions of abdominal organs, particularly the appendix, from acute tubal affections or ectopic tubal gestation. Studies on the frequencies but above all the exact

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distribution of skin hyperesthesia in disorders of the fallopian tubes may afford another clue in the differential diagnosis

Innervation of the fallopian tubes I Efferent neurones The motor fibers to the tubes are derived from the ovarian plexus and the uterovaginal plexus Nerves to the ampulla are given off from branches of the ovarian plexus passing to the ovary while those to the isthmus come from the uterine branches of the uterovaginal plexus (Morris and Jackson) The ovarian plexus arises from the intermesenteric and renal plevuses overlying the abdominal aorta. The ovarian plexus then continues downward into the pelvis closely following the course of the ovarian vessels Besides supplying the ovary it sends fibers to the fallopian tubes and broad ligament and communicates with the uterovaginal plexus within the broad ligament (Kuntz, personal dissections)

Afferent neurones The afferent fibers pursue a course similar to the efferent nerves with the exception of a detour via the posterior roots to reach the sensory nerve cells in the posterior root ganglion The afferent fibers from the overs traveling along the ovarian plexus reach the cord at the level of the tenth thoracic segment. Kuntz believes that the afferent fibers from the uterus and tubes run through the superior hypogastric plerus (presacral nerve) However, recent experiments on the course of the sensory nerves of the ovarian plexus in the cat show that afferent fibers from the tubes also course through the ovarian plexus (Labate and Reynolds-1936) The afferent fibers from the isthmic portion probably follow the course of the efferent fibers through the superior hypogastrie plexus

It is generally believed that the afferent fibers from the tubes enter the cord at the levels of eleventh dorsal to first lumbar segments (Kuntz and others) The distribution of skin hyperesthesis in acute salpingtis, as will be reported in subsequent paragraphs,

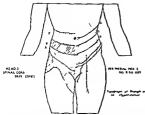


Fig. 1. Relation of topographical triangle of skin hyper esthesia to the areas of distribution of Head a cord eigments involved in tubal dissease. The distribution of peripheral sensory nerves is shown on right and Head's skin gones are depicted on the left.

includes the surface of the abdomen correponding to the cutaneous distribution of the pain fibers issuing from the tenth dorsal. This may he due to a process of diffusion of skin tendemess. But since, as mentioned, afferent fibers from the tubes have been found to run in the ox arian plevus, it may he possible that some of the afferents from the tubes also enter the cord at the tenth dorsal

Cutaneous sensory distribution corresponding to the tenth dorsal to first lumbar Head (1803) marked the whole of the body and limbs into areas each of which corresponded to the "cutaneous distribution of the pain fibers given off from one segment of the cord ' Figure 1 illustrates the areas of cutaneous distribution of the pain thers given off from the segments of the cord from tenth dorsal to first lumbar which are involved in affections of the fallopian tubes The areas corresponding to the cutaneous distribution of the pain fibers given off from the tenth dorsal and first lumbar segments are found to involve the entire lower abdomen and a portion of the upper part of the thigh (Fig. 1) Actually however the areas are never found to be so sharply delimited Subsequent writers have altered this distri

Sunsequent writers have aftered into distinct button. Thus Head's first lumbar region corresponds more closely to that which Thorburn and others have assigned to the second umbar Anatomical dissection has shown that

the first lumbar is mainly distributed above the line of Poupart's ligament, where Head has the twelfth dorsal and that only a portion of its area lies helow the ligament on the from and miner sade of the thigh. Finally Thorhum places the umbilicus no higher than the lower part of tenth dorsal. Rudinger shows the umbilicus at eleventh dorsal, Quain hetween the tenth and eleventh dorsal, Schwalbe opposite tenth dorsal and Patterson claims it hes between the tenth and eleventh dorsals (as quoted by Thorhum)

MacKenzie (1893) contradicted Head's sharp delimitation and claimed that reference of pain was along the course of peripheral nerves "whose root was in intimate association with the root of the sympathetic nerves that supplied the affected organ." Thus he explaimed the overlapping of sen-ory fields since he noted that "in very few of the cases could the field of hyperesthesia he delimited with certainty. "Ligat (1903) also found that the "hyperalgesia was never distributed evenly over any one segmental area." In the present study, maximal points of tendemess and skin hyperesthesia were observed but no complete limitation according to Head's segmental zones.

Theories concerning the production of skin hyperesthesia Skin hyperesthesia is an altered response to stimulation of the skin surface due to some disturbance within an internal organ It is produced through a viscerosensory reflex. the afferent component heing situated within the disturbed viscus Ross in 1888 elaborated his theory of referred pain which is similar to the so called MacKenzie theory, but insisted on the presence of visceral (splanchnic) pain Studies of viscerosensory phenomena were made independently by MacKenzie (1893) and Head (1803) The former elaborated the theory that viscerosensor, phenomena were due to an overflow of sensory impulses from the sympathetic afferent component to involve certain cerebrospinal sensory roots with which it comes in contact within the central nervous system "If we consider that a stimulation arises in an organ and is transmitted by afferent nerves to a more central situation and if this stimulation he of sufficient force or of the proper quality to affect certain nerve mosts with which it comes in contact, then,

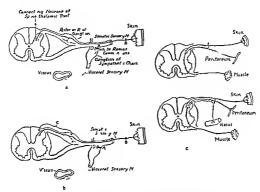


Fig 2 a, Mechanism of referred pain, the Ross-MacKenzie theory: Affectnt impulses pass through the visceral sensory networe by any of white ramis communicans to connecting neurone of the spinothalamic tract and are interpreted by higher centers as coming from somatic sensory nerve which also connects with the spinothalamic tract. Visceral pain may be interrupted by blocking nerve at A. But this theory fails to explain how a block at 8 releves pain (After Woodbridge from LeMaire)

b. Mechanism of referred pain, the Edinger LeMaire theory Portion Cof the

b Mechanism of referred pain, the Edinger LeMaire theory Portion C of the somatic sensory nerve is supposed to be interpolated in the course of afferent visceral impulses LeMaire assumes that a block at B affects the prorumal as well as visceral portion of the somatic sensory nerve and so stops transmission of afferent visceral impulses at C (After Livingston from LeMaire)

c Relation of afferent fibers from the parietal peritoneum and from the viscera in the caucation of localizing abdominal signs and symptoms (After I lyingston from

Morley)

according to the function of the nerve root there will arise phenomena peculiar to the organ stimulated" (MacKenzie) (Fig 2, a)

Head presented his ideas of referred pain as being due to an irritable focus within the spinal segment set up by a bombardment of afferent impulses from the disturbed viscus "Then," states Head, "a stimulus applied to the skin over the area supplied by the nerve roots belonging to this segment will be exaggerated and a stimulus which normally perhaps was only uncomfortable would now appear very sensitive"

LeMaire (1926) believes that an actual synapse occurs within the dorsal root ganghon between the visceral and somatic afferent neurones. From this point of union the stimulus is then carried centrally from the dorsal root along a common pathway (Fig. 2, b)

Finally Morley (1931) states that pain resulting from visceral disease is referred to a somatic cutaneous area only when the parietal pentoneum is involved (Fig. 2, c)

METHOD OF STUDY

Every patient admitted to the gynecological wards of Bellevie Hospital with an admission diagnosis of salpingitis through a period extending from July to December, 1935, was evamined carefully for skin hyperesthesia

a Technique Skin hyperalgesia can be elicited accurately only if a proper and adequate stimulus is applied Various methods are available for testing for skin tenderness Robinson (1908) and Cope (1924) punched lightly very small portions of the skin with the finger tips and stroked the abdomen with the head of a common pin Sherren (1903) gently

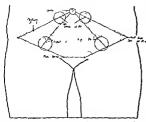


Fig. 3. Composite drawing of different areas of skin hyperesthesia found in acute salpingsits. The bands of circles between and around the spino umbilical and Ligat points are the sites most frequently involved and the site of maturial skin hyperesthesia. Note the extent of skin hyperesthesia into the thighs which occurred in a case.

stroked the slin Ligat grasped the slin and subcutineous tissues between the inger and thumb and applied traction from the deeper layers of the abdominal wall. Livingston used a vigorous pinch of sufficient intensity to produce discomfort on normal slin. The use of heat and cold or deep scratching with a dulf instrument are other methods which may be used.

The milder forms of testing such as stroking the skin with a dull instrument, heat and cold, and light pinch were used early in this study but were found to be inadequate. An adequate stimulus must be applied in order to elicit skin hyperesthesia accurately Therefore we com bined traction with a vigorous twist. The skin and subcutaneous tissues were grasped be tween the thumb and foreinger, care being exercised not to exert any downward pressure on the deeper structures The skin was then pulled straight out simultaneously exerting a vigoro is twist. A preliminary stimulus of a similar nature was applied first over an unin volved area of the skin to determine the nationt's pun threshold This initial pull was used as a standard of intensity and pulls of equivalent intensity were used over the entire abdomen Every part of the abdomen was tested carefully beginning over uninvolved areas and systematically working toward the area of sensitiveness. Thus the total area of

TABLE I -SLIV HYPERESTHESIA IN ACUTE SALPINGITIS

ONE INOTES							
	Posstive				Slight or		
Cases	Frqu sate		Moderate		absent		Per cent
	مد	Per cent	30	Per cent	10	Per cent	
51	26	40	15	24 3	17	22 7	77 5
Shin h peresthesia in mild (aubacute or chronic) salpingitis							
Io	4	40	3	20	4	40	60 00
Skin bypertsthesia in tubo-ovarian abscess							
8	۰		۰		•		٥
Sk a hyperesthesia in pelvie cellul tis							
3	1		1		•		

hyperalgesia was mapped out at the same time noting the points of maximum sensitivity

A parallelogram was outlined on the abdo men of every patient. A line was drawn from the umblines to the anterior superior spine of the flum. Another line connected the anterior superior spine of the lilum with the spine of the pubis. The process was repeated on the side opposite (Fig. 3). Within this diagram McBurney's and I gat's points were plotted. The relation of the areas of maximal skin hyperesthesis to the fixed points corresponding to the umbliness, the anterior superior spine of the flum, and the spines of the pubis were studied necurately in case patients.

b Ecaluation of the sign The elicitation of pain was used as the criterion of increased sensibility. Only when traction of the skin caused definitely demonstrable discomfort as evidenced by wincing of the patient or by her attempt to brush away the examiner's hand was any credence placed on the sign Skin by peresthesta was considered positive only when unquestionably present. Slight or questionable response, was considered negative.

The following factors may confuse the interpretation of skin hyperestbesa: (1) There is a certain amount of discomfort when the skin over the abdomen is pulled normally. (2) Extreme deep tenderness will cause the patient to cry out with pain unless extreme care is taken to grasp only skin and subcutaneous tissues. (3) Distention makes it difficult to pick up the skin without verting downward

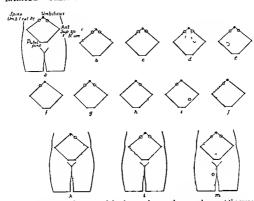


Fig. 4. Various combinations of skin hyperesthesia with maximal areas at the spino umbilical point. The dark circles signify areas of maximal hyperesthesia and the areas within the dotted lines denote total distribution of skin hyperesthesia.

pressure on deeper structures (4) Obesity makes accurate localization of skin hyperesthesia more difficult because only large areas of the skin can be grasped at one time (5) The hyperesthetic patient will cry out or complain even when no real hyperesthesia is present (6) Tender and enlarged inguinal lymph nodes will give a false positive sign and the area of maximal hyperesthesia may be falsely localized here

RESULTS

a Skin hyperesthesia in acute salpingitis Trity-three patients with acute salpingitis were examined and of these 26 or 49 per cent showed exquisite skin hyperesthesia while 15 or 28 3 per cent had moderate hyperesthesia. Thus 77 3 per cent of the patients showed positive skin hyperesthesia. In the 12 remaining or 22 7 per cent skin tenderness was not elicited (Table I)

The total extent of skin hyperalgesia varied markedly in individual cases In 77 per cent of the positive cases hyperalgesia was bilateral, but symmetrical areas were not necessarily involved Hyperesthesia occurred either over a wide area involving one or both lower quadrants or, as happened most frequently, over

small zones involving only segments of the lower abdominal cutaneous surface (Fig. 3) Figure 3 represents a composite drawing of different areas of the abdomen which may be sensitive in acute salpingitis. The skin surface which may become hyperesthetic will be seen to be quite extensive and may involve all or small parts of the lower abdomen below the umbilicus, internal to the anterior superior spine of the ilium and above Poupart's ligament The total area of the skin hyperalgesia associated with acute salpingitis may be represented by a quadrangle which is bounded above by a line drawn horizontally from the umbilicus, limited below by Poupart's ligaments and laterally by a perpendicular line drawn internal to either anterior superior spine of the ilium. In a few instances skin hyperesthesia will extend into the thighs It must be emphasized, however, that this entire area may not be involved and that it may not be equally hyperesthetic throughout Several areas of maximal skin hyperesthesia are always found In fact in many of the patients examined skin hyperestbesia was demonstrated on'y at the so called maximal points (Figs 4 to 6)

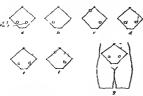


Fig 5 Combinations of skin hyperesthesia with manimal area at Ligat's point

Table II shows the sites of maximal skin hyperesthesia as determined in this study The position of the spino umbilical point, is described as an arbitrary point 25 centi meters lateral to the umbilious on a line drawn from the anterior superior spine of the ilium to the umbilious The maximal area of skin hyperesthesia was localized at the spino umbilical point in 50 per cent of the positive cases The slin over this area may become extremely sensitive, a light grasp being sufficient to cause the patient to wince or cry out with pain Hyperalgesia may diffuse down ward from the spino umbilical point in the form of a narrow band as shown in 16 7 per cent of the positive cases In this connection it is interesting to note that Ligat (1919) stated that spread from the maximal point occurs "in a vertical direction, the hyperes thesia almost always extending further in a downward than in an upward direction "

In 12.7 per cent of the positive cases, the maximal area of skin hyperesthesia was found at Ligat's point. In a smaller number skin hyperesthesia was found to be maximal at the spino umbilical point on one side and at Ligat's point on the opposite side. Table II shows the different areas of maximal skin hyperesthesia that vere found (Fig. 7).

Skin hyperesthesia in many cases of acute salpingitis may be demonstrated only at these maximal sites. However, careful examination in many cases may show an associated area of skin tenderness of less intensity which may involve variable portions of the lower ab domen (Figs. 3 to 6). The most acute case of acute salpingitis with high temperature, leuco-

TABLE II -SITES OF MAXIMAL SAIN HYPER ESTHESIA IN ACUTE SALPINGUES

COLUMN IN ACULE SALPIN	CITIS	
	Cases	Per cen
Speno umbilical point	20	50
Band from pino-umbilical point diffusing		J-
down to Ligat's point	8	16 7
Spino umbilical point on one side-band		,
on other	2	4 1
Spino-umbilical point on one side-Ligat	-	• •
on other	2	4.1
Band on one side-Ligat s point on other	-	2 0
Ligat s point	6	
rafte a bour	U	12 7

c) tosis, elevated erythrocyte sedimentation rate, and pelvic peritonitis may fail to develop skin hyperalgesia Skin hyperesthesia occurring over the described maximal areas particularly at the spino umbilical point is characteristic of acute salpingilis but must not be relied upon solely to make the diagnosis. It must be stated emphatically that the absence of skin hyperesthesia has no negatite value greatest value lies in the location of the may mal areas of skin sensitivity since in acute appendicitis also, hyperesthesia is found in the right lower quadrant and in ureteral colic hyperesthesia is elicited within the inner sur face of the thigh But in acute appendicitis the area of maximal skin hyperalgesia is at McBurney's point, and in ureteral cohe the maximal area will be found in the thigh (Livingston) Acute salpingitis never produces skin hyperesthesia which is maximal at Mc

Burney's point or in the thigh A glance at Figure 3 will show that the total area of skin hyperesthesia is represented as extending into the thighs. In a cases of acute saipingitis hyperalgesia was observed in the unner aspect of one or both thighs, roughly medial to the sartorius muscle. The sensitive zone was never maximal and usually involved an area 4 to 8 centimeters in diameter at a variable distance below Poupart's ligament The pressure of the bed clothes on the thighs produced sufficient discomfort to cause these patients to complain on rounds. It is also interesting to note that patients with acute salpingitis often had referred pain along the inner part of the thigh, at times extending as far down as the knee

Two cases of parametritis, one postabortal, the other postoperative, showed skin hyper algessaover thenner surface of the thighs One other patient with parametritis had no skin

TABLE III —POINTS OF MAXIMUM TENDERNESS
IN ACUTE SALPINGITIS

	Unilateral	Bilateral	Total	Per cent
Ligat s point	13	13	31	55 4
Spino-umbilical point	5	. 7	12	21 4
Ligat's point on one side Spino umbilical point on other	0	10	10	17 1
Absent maximum tenderness		4	14	7.1

hyperesthesia These cases are mentioned at this time merely to suggest that the presence of skin hyperesthesia over the thighs in acute salpingitis may mean the presence of an associated parametritis, the inflammatory exudate within the broad ligament producing pressure on afferent nerve fibers

In 554 per cent the point of maximal tenderness was at Ligat's point. This is contrary to the location of maximal skin hyperesthesia at the spino-umbilical point in the majority of cases. We may conclude, there fore, that the point of maximal tenderness need not be identical with the point of maximal skin hyperesthesia. In 214 per cent deep tenderness was found to be maximal at the spino-umbilical point. In 171 per cent maximal deep tenderness was located over the spino-umbilical point on one side and over Ligat's point on the side opposite. No area of maximal tenderness was demonstrated in 71 per cent (Table III)

b Skin hyperesthesia in mild (subacute or chronic) salpingitis Ten patients were observed in this phase of salpingitis In 4 skin byperesthesia was exquisite, in 2 moderate, and in 4 no skin sensitiveness could be demonstrated. Hyperesthesia was bilateral in 2 and unilateral in 4. The total distribution and points of maimal skin hyperesthesia were similar to those occurring in the more acute tubal inflammations.

c Hyperesthesianitubo-ovarian abscess Eight patients possessing tubo-ovarian abscesses were examined frequently for skin hyperesthesia. In none of the patients could byperesthesia be demonstrated. The absence of skin hyperesthesia in these patients may be due to the prolonged destructive process of the inflammatory exudate which must involve the terminal endings of the nerves. Anyone fa-

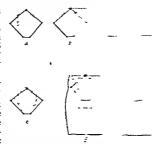


Fig 6 Combinations and mal area as a spino-

miliar with the miliar ovarian abscess will be advanced destructive brane. If, as Ligat Left viscerosensory reflex to hyperesthesia should be asset to be a second or the second over the seco

d Skin hyperestress conditions of the ferrito ypatients with ectrois examined for skin cases with external --liberation of blood ire : one showed any are: : one patient where broad ligament, 72pelvic hematoma, == sia was elicited Fire thesia in this case : escape of blood with ligament with res_ of afferent nerve ligament

Here we should? differential diagon, gestation had act, of skin hyperestly salpingitis rather, fortunately, horhyperesthesia L. acute salpingitis.

diagnosis of ect -

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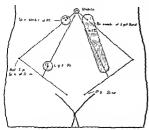


Fig. 7 (Taphic representations of various points of matural Jain hyperesthesis found in acute subjunctive to the order of frequency of the matural sites. In 10 per cent the area of matural skin hyperesthesis as present as a band connecting the spino-umbilical point and I igst 5 point.

there was a positive skin hyperesthesia the patients were operated upon and acutely inflamed tubes were found at operation. In no patient showing positive skin hyperesthesia was an ectopic pregnancy demonstrated at oneration.

Why skin hyperesthesia fails to appear in cases of tubal gestation is not easy to under stand Two possibilities come to mind (1) An ectopic pregnancy produces a localized swelling 3 to 4 millimiters in length localized in one small portion of the tube. This results in stimulation of only a few of the afferent nerve endings which may be insufficient to produce reflex reaction. On the other hand the inflammatory reaction in acute salpingitis is widespread involving the entire tube (2) Implantation of the ovum within the mucosa with subsequent development and destructive tendencies of the chorionic tissue results in early destruction of the mucosa. Thus with the destruction of the mucosa the reflex arc is destroyed Ligat (1919) considered the origin of the viscerosensory reflex as lying in the mucosa

Additional cases of ectopic pregnancy are being studied at the present time to prove more conclusively the persistent negative hyperesthesia findings. The results of this study will be reported in detail in a subsequent paper

Four cases of ovarian cysts, I case of endo metrosis, 3 cases of intra uterine gestation, 3 mocomplete abortions, and I carcinoma of the oxary, failed to show any hyperalgesic areas Eight cases of uncomplicated uterine fibro myomas likewise showed no skin hyperes thesia. However, when an associated salpin gitts was found, skin hyperesthesia occurred Thus of 3 cases of fibroids complicated by salpingitis, 2 showed exquisite skin hyperes thesia over areas typical for salpingite thesia over areas typical for salpingite.

IMPRESSIONS

Skin hyperesthesia when present will be found if proper care is exercised. An adequate stimulus must be applied properly and sufficient time and care should be taken to deter mine the exact location of maximal skin hyperesthesia It is at times difficult to choose between the spino umbilical point and Ligat's point as the maximal area of skin hyperes thesia. At one time the one point will be found maximal, but returning a few minutes later or next day the other point will be found to be maximal. On a number of occasions, also, the maximal area of skin hyperesthesia can be determined only as a band diffusing in a downward direction from the spino um bilical point

The following incidences may be cited which subtract from the actual value of skin hyper esthesia as a sign. Hyperesthesia was demon strated in several patients who were thought to have no disease of the adneya. In 1 other case a diagnosis of ectopic pregnancy was made, but operation failed to show any demonstrable pathological condition of the tubes or elsewhere to account for patient's symptoms This patient showed definite skin hyperesthesia On the other hand several patients were observed with the pre operative diagnoses of ectopic pregnancy and skin hyperesthesia was noted. At operation subacute or chronic salpingitis was disclosed, a hading which explained the presence of hyper algesia

In summarizing the impressions gained during this study, skin hyperesthesia, as related to pelvic inflammatory conditions,

may be said to have the following characteristics

- I Skin hyperesthesia may be entirely absent in the most acute case of salpingits with elevation of erythrocyte sedimentation rate, leucocytosis, pelvic peritonitis, and severe pain patient may persistently fail to develop hyperesthesia. Thus the presence of skin sensitiveness cannot be used in gauging the secrity of the infection. Also the absence of skin hyperesthesia has absolutely no negative value. However, it may be stated that all patients having the initial attack of acute salpingitis consistently showed skin hyperesthesia with the maximal areas at either of the previously described zones.
- 2 Skin hyperesthesia may be of fleeting character. It may be present on admission and gone in a few hours or by the next day to return at some later time or never to return It may be absent on admission but on examination a few days later skin sensitivity may be found. It is difficult to explain this characteristic of skin hyperesthesia. It seems to bear no relation to increase or decrease in the severity of the infection. Many of the patients show this fleeting type of skin hyperesthesia.
- 3 The persistent type of skin hyperesthesia which is present on admission and remains throughout the acute phase of the disease is also encountered. As the patient is examined daily, hyperesthesia will be found. Many times the maximal area of sensitiveness shifts between the spino-umbilical point, Ligard's point or a band connecting these two points. In this type as the patient improves, the hyperalgesia will tend to disappear, only to recur again with an exacerbation of the disease. The total duration of skin hyperesthesia in these patients varied between several days to 26 days.
- 4 The maximal area of skin hyperesthesia bears no relation to the maximal area of deep tenderness except in some cases. Therefore, one must not predict the area of maximal skin hyperalgesia according to the location of maximal deep tenderness.
- 5 The total area of skin byperesthesia is variable, rarely very severe, and determined only with the exercise of diligence

6 A maximal area of skin sensitiveness can always be determined. The location of this point offers sufficient aid in the diagnosis, since in acute appendicitis maximal skin hyperesthesia occurs at McBurney's point, whereas in uneteral colic it will be found in the inner portion of the thigh within the urogenital trigone.

CONCLUSIONS

r Fifty-three cases of acute salpingitis were examined frequently and 77 3 per cent showed the presence of skin hyperesthesia

2 Of 10 cases of mild subacute or chronic salpingitis 60 per cent showed positive skin

hyperesthesia

3 All patients with tubo ovarian abscess persistently failed to develop skin tenderness

4 The maximal area of skin hyperesthesia in acute salpingitis can always be determined. This may occur at the spino-umbilical point (50 per cent) or at Ligat's point (12 7 per cent). Frequently (16 7 per cent) skin tenderness is found to diffuse downward from the spino-umbilical point in the form of a band.

5 Skin hyperesthesia occurring over the above maximal areas is characteristic of acute salpingitis but must not be relied upon solely

in making the diagnosis

6 The absence of skin hyperesthesia in

acute salpingitis has no negative value

7 Of 12 cases of ectopic tubal gestation in failed to show the presence of any skin hyperesthesia. The presence of skin hyperesthesia favors the diagnosis of salpingitis. In only one case in which a broad ligament hematoma was formed could any skin hyperalgesia be elicited.

8 The presence or absence of skin hyperesthesia cannot be used to determine the

severity of the infection

9 Skin hyperesthesia must be evaluated intelligently. It may be quite flecting in character or it may be persistently absent in the face of the most severe infection of the tubes.

10 The total area of skin hyperesthesia is

variable and rarely very severe

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ENTERECTOMY IN THE SURGICAL TREATMENT OF HEPATIC CIRRHOSIS OR PORTAL OBSTRUCTION

WITH ASCITES

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N THE medical treatment of cirrhosis of the liver with ascites, a high carbohydrate diet has been shown in certain cases to reduce the rate of ascitic accumulation (r) Various drugs have been used, such as salyzgan and merbaphen (novasural), saline and hydragogue cathartics, digitalis and iodides but as £ J Strode says, in his recent excellent review "the medical treatment of cirrhosis of the liver is most discouraging"

As a palliative treatment paracentesis has been used in the hope of extending the lives of cirrhosis patients Reports of spontaneous recovery following one or more tappings are noteworthly rare, though Walter Hughson concludes that "probably as many cures have been obtained by its employment as by any other single method" The persistent adherence to the use of paracentesis by intermists is justified in that it relieves the patient of the distress and interference with cardiac and pulmonary function, which large collections of ascitic fluid entail. At the same time, as aptly summarized by Hughson, "the failure of surgical treatment to show any uniform degree of benefit has developed a more or less natural hesitancy on the part of the internists to subject their patients to operation "

Hughson says "Consideration of the technical difficulties of performing an Eck fistula on a human being is purely incidental in relation to the inevitably fatal outcome following its successful execution" With care, about one-third of the normal dogs survive the production of an Eck fistula. Many die of septicemia According to Fischler, two types of intovication occur following Eck fistula in dogs. The first is due to degenerative necrotic lesions of the liver regularly causing

death preceded by symptoms of manic excitement and ending in coma or convulsions. This second intoucation is that produced by meat feeding and though not necessarily fatal is characterized by blindness atavia, muscular twitchings, and excitement. Most authorities hold little hope for the clinical application of the Eck fistula or any of its modifications.

A variety of ingenious surgical procedures for the treatment of ascites have been developed Some procedures are designed to cause return of the ascitic fluid to the systemic circulation by saphonous venoperitoneostomy (6), some to drain the fluid into the subcutaneous tissues of the abdominal wall by a variety of methods such as the use of collar button like glass cylinders designed by P Paterson which are fixed in the peritoneum and abdominal muscles, while numerous other attempts have been made to drain the fluid through different parts of the urinary system In the 25 years that the more bizarre methods have been before the profession they have not gained in favor

Efforts to treat ascates by the establishment of a collateral circulation have usually taken the form of some kind of omentopexy This operation, which has come to be known as the Talma-Morison (2, 8) operation, is at present the most popular major surgical procedure in the treatment of ascitic cirrhosis Writers vary in their evaluation of it Hughson states "In the present series of 26 cases regarded as correctly diagnosed from either operative or autopsy observations or both, it is impossible to conclude that surgical treatment instituted for the purpose of establishing additional collaterals is of the slightest benefit in portal cirrhosis with ascites," and in evaluating the literature on omentopexy he concludes "on the bass of correct dagnoss the figure generally accepted as representing the expected benefit from operation, 35 per cent, would fall to approximately to per cent, and more careful analysa would undoubtedly reduce the estimate even further"

TREORY

On the theory that accumulation of ascitic fluid in cirrhosis is due in a large part to par tal obstruction of the portal circulation in the liver by nodular regeneration of glandular intessue and gradual contraction of increased connective tissue, the hypothesis was developed by Fuller and Cook that obliteration of part of the portal bed by resection of several feet of small intestine might decrease the returning venous blood to an amount which might pass through the cirrhosed liver, thereby decreasing the pressure in the portal vens and capillaines and diminishing the transulation from the portal system into the peritoneal cavity

Of the four important reasons underlying the theory in the development of this procedure, the first (mechanical) is the most obvious, namely that ohliteration of part of the portal venous bed by enterectomy will result in a decrease in the amount of portal blood

entering the liver

The second (physiochemical) is more hy pothetical though hased upon Heidenbam's classic experiment in which he demonstrated that bypertonic solutions of crystaloids in an isolated segment of small intestine increased in volume at the expense of water drawn from the intestinal circulation.

In this part of the theory we propose the possibility that in the remaining small intes time following enterectomy with the same amount of food and gastric, hepatic, and pancreatic secretions the relatively higher concentration of osmotically active particles present in relation to the surface area of the intestine, should tend toward a slower ab sorption of water into the capillary blood of the intestinal wall and furnish on the venous portal side of these capillaries a more concentrated blood of less fluid volume. The water content of the feces should be increased.

softer stools following massive enterectomies The third reason takes cognizance of the

The third reason takes cognizance of the generally known phy sological fact that living membranes become more permeable in the presence of oxygen lack or metabolic waste product mcrease. In cirrhosis of the liver, because of the slowing of the portal stream, the venosity of the portal blood should be increased. Therefore, any procedure aimed at decreasing the venosity of the portal hlood should lessen the permeability of the portal capillanes and other membranes and hy turnishing to the liver a less venous hlood, increase the chances of regeneration of liver tissue.

Fourth, removal of several feet of small intestine changes the ratio of visceral per toneum to parietal peritoneum Assuming that the ascitic fluid transudes through the visceral and is absorbed by the parietal peritoneum, removal of several feet of small intestine with its peritoneum should favor absorbtion of any fluid formed

Three possible procedures were considered (1) removal of from 7 to 12 feet of small in testine, (2) removal of 7 to 12 feet of small intestine and omentopery at the same opera tion, (3) intestinal resection and omentopery at the first operation to be followed by sple nectomy if asoftes persisted

REPORT OF CASE

In Oatober, 1931, the patient a white male of 35 pers awakened one night with chills and fever and noticed in the nutror that his sin was ashen gray For 2 months he was very weak had some tough night sweats chills and fever. In coughing he raised only a white frothy spatium. In addition to malase, his appetite was poor, he experienced per select constitution of the was to work the rest of the selection of the selection of the waste of the selection of the waste of the weight of 1931 he weighed 185 pounds and measured 35% inches at ound the waste by April 1932 he weighed 145 pounds and measured 35% inches at ound the waste by April 1932 he weighed 145 pounds and measured 315 pounds and measured 315 inches at the belt line. Between April and May 1932 his weight increased 15 pounds and his belt was let out to 355% inches, and by July his girth had increased of 385% inches and his weight was further increased

By July 1932 his ashen color was not as notice able his constitution was not as bothersome be cause of the use of mineral oil but he coughed more raising the same white frolby sputium. He had hon pain no shortness of breath and no apparent edema but his clothing seemed noticeably tighter about his abdomen. Late in July, 1932, on slight

exertion he developed shortness of breath and ob served that his ankles were swollen

Physical examination showed a well developed male of apparently his stated age with skin of yel lowish gray color The blood pressure was 90/64 millimeters mercury and the pulse was 120 per minute, but, with bed rest and digitalization, the blood pressure soon became 106/75 and the pulse about of

X-ray examination of the chest showed only a slight clouding over the bases of the lungs posteri orly, and a cardiac shadow of questionable to 30 per cent enlargement. Liver function and kidney function tests were within normal range pig inoculation with sputum and ascitic fluid was Electrocardiograms showed chiefly a decreased cardiac amplitude. Urine output, on restricted fluid intake, was about 800 cubic centimeters daily, and contained neither sugar nor albumin

The blood picture was normal

The patient's abdomen continued to enlarge and paracentesis was first performed October 15, 1932, at which time 6 o liters of ascitic fluid were obtained On November 4, 1932 he was tapped again and 6 liters was obtained Sixteen days later November 20 paracentesis yielded 7 liters and again on De cember 4, 7 liters, and on December 23, 6 liters of ascitic fluid was obtained In the next 10 months he was tapped a total of 21 times The maximum ac cumulation for a single tapping was 20 liters in 90 days, but the patient did not gain in weight from the sixty-eighth to the ninetieth day

The ascitic fluid showed no change in character during this 19 month period, being of clear amber color with a specific gravity of 1 015 to 1 017 and containing a protein coagulable by heat There were a few small and large lymphocytes present. No bacteria were ever seen and cultures of the fluid were consistently negative. For the s tappings during the 62 days previous to the operation, the average as citic fluid accumulation was o our liters daily

From the onset it was noted that after tappings the râles over the lungs posteriorly and the edema of the ankles for the greater part disappeared After each paracentesis for 2 or 3 days the patient could be fairly active with only a slight shortness of breath However, as the accumulation of ascitic fluid con tinued, the edema of the ankles returned and the patient resumed his bed or wheel chair existence

The rapid heart and decreased urine output from the first led to repeated use of digitalis and such diuretics as salvigan. These and high carbohy drate diets were noteworthily ineffective in altering the rate of ascites formation and for several months prior to presenting himself to us for operation his only treatment had been paracentesis and liberal use of codeme and other opiates

Pre operative condution Upon presenting himself to Drs Walter Zbitnoff, and Fuller for operation, the patient's chief complaint was that of ascites The edema of his ankles and shortness of breath in creased with fluid accumulation and largely disap

TABLE I -- PARACENTESIS RECORD

IABLE I	111000		
Date	Number of days accumulation	Number of liters of ascitic fluid obtained at paracentesis	Liters per day
Belare Operation July 18 1034	21	19	909
August 1	34	13	928
August 15	14	13	928
August 25	10	to	1 000
August 18	3 4		1 333
Operation August 29 1934			
After Operation September 18	22	6 5	302
September 26	8	6 5	812
October 5	10	4.5	450
October 14	50	4.5	450
October #5	11	8	727
November 7	13	5 5	423
November 21	15	8	533
December 3	12	6 5	341
December 12	¢	\$ 5	611
December 22	10	5 75	375
January 2 1935	11	5.5	500
January 13	11	8	727
January 24	11	6	545
February 6	13	2 675	305
February 17	11	4.5	409
March 4	15	5.5	366
March 14	10	5	500
March 31	27	\$	294
April 10	žů.	4	400
April 22	12	4 75	354
May 13	22	6 5	200
May 25	16	None	

peared following tappings. After paracentesis the abdominal wall was loose and flabby, and no ab normal masses were to be felt. The liver could be palpated above and under the flared costal margins His blood pressure was 106/74 millimeters mercury The heart rate was 90 per minute. There was no enlargement of the heart to percussion A small umbilical hernia was present

Hemoglobin was 90 per cent, erythrocytes num bered 4,850,000, leucocy tes, 9,600, coagulation time was 2 minutes His daily urine output was about Soo cubic centimeters with a specific gravity of 1 025, acid reaction to litmus, amber in color, and contained no sugar, albumin, or cells The ascitic fluid was a clear, straw amber color with a specific gravity of 1 015-1 017 It contained protein coagu

lable by heat. His stools were well formed with one howel movement daily. The Wassermann and Kahn tests were consistently negative.

The operation. Under ethylene oxygen plus ether amethexa, a right rectus (in centimeter) incision was made and about 3 coo robe centimeters of ascitic fluid nas aspirated. The parietal pertinentum was somewhat injected and slightly thickened. The her was smaller than normal. Its surface was using formly nodular the nodules being about pea size (5 to 8 millimeters in diameter). The here margins were rounded. It appeared dark gravish red in color No biopsy of the liver was made. The omentum was

shrunken

Beginning 12 inches below the duodenojejunal
junction 6 feet 8 inches of small intestine was re
moved The ends were joined by lateral anastorios

35. The abdominal wall was routinely closed must
have been supported by the state of the state o

out drainage

Pastoperati e care. The patient stood the opera tion surprisingly well and the postoperative care was as simple as possible. One liter of 5 per cent intravenous glucose solution was administered and ice nater in small amounts was given by mouth beginning 6 hours after operation. A soft diet was given within 24 hours Morphine and codeine were used as needed for pain Small oil and 1 2 3 chemas with return flow were used to relieve gas and keep the large bowel open. In general the patient seemed to have but little more distress than does the usual appendectoms case. There was no postoperative rise of temperature. The wound healed by first in tention the patient was allowed up on the tenth day and walked out of the hospital on the four teenth day

Possepéraine course. On the tenth postoperative day there was no decetable fluid on physical examination of his abdomen, and the ankles were fire from edema for the first time in over 2 years but by the fourteenth postoperative day the presence of abdominal acques was descernable. The patient was tapped on the twenty second postoperative day and 6 s interes of accrite fluid was obtained. For the office of the control of the transfer of the tr

In the next so days 's tappings) the average daily output was 0.56 hiers per day in the next sy days (5 tappings) 0.467 hiers per day in the next 64 days (5 tappings) an average of 0.371 hiers per day 12 days later with an average of 0.300 hiers per day (2 tappings) 3.67 days following the operation askites formation ceased and there has been no evidence of fluid in the abdomen to date.

From date of operation to present time the patient's general physical condition has constantly improved he has gradually gained in weight and now weighs 15 pounds more than before operation

Nor were all the benefits from the patient s view point to be measured in actual per day accumulation of fluid. For two and one half years before the operation he spent most of his time in wheel chairs and bed leaving his 'bath robe and house slipper exisence only for 2 or 3 days immediately following tappaings. From the time of the operation on however the patient has been active almost every day. The halved rate of ascitic accumulation for the first 6 months following operation allowed him to near his business clothes comfortably and inconspicuously. During the 2m months of complete freedom from ascites his comfort and well being have further improved. From his former hopeless outlook he has become mentally well rehabilitated and his zest for lung has returned.

This case has been under observation from July, 1932, until the present time, a penod over 5 years During this time the patient received no rehel from his assites by incideal treatment. There had been a gradual increase in the amount of ascitic fluid as well as a greater frequency of tapping until August 29, 1944, the date of operation.

A search of the literature has failed to re veal a previous case of enterectomy in the treatment of portal obstruction or cirrhosis

of the liver

After operation no dietary regimen was imposed, the patient being allowed to follow his appetite as to any type and amount of food and liquid desired. His unne output has averaged 1300cubiccentimetersdaily. Though the patient has not been constipated, he has had no tendency to diarrhea sometimes noted following massive enterectomy.

CONCLUSION

We have presented one case of portal cir rhoses with ascites of more than 22 months' duration treated by tapping, with no tendency toward diminution. After massive intestinal resection the rite of ascites accumulation was immediately approximately halved, and following a period of gradual decrease of ascites its formation ceased 9 months after the operation. The pattent has now been free from ascites for 29 months.

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RELAXIN IN HUMAN SERUM AS A TEST OF PREGNANCY

1898, 35 833

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N 1934 one of us (1) collaborated in a study of relaxation of the pelvic joints in pregnant humans, based on a large series of roentgenological and clinical material Similar studies have been reported by Heyman and Lundquist, Barnes, Brooke, Roberts and Briston, and Thoms The conclusions, while differing slightly in detail are all in agreement on two essential findings (1) that relaxation of the pelvic joints is a normal physiological occurrence during pregnancy, and (2) that this relavation is demonstrable so early in pregnancy by x-ray that any mechanical etiology is rendered extremely unlikely

In 1020 Hisan and his co-norkers were able to show that there was a substance elaborated by the corpus luteum of guinea pigs which caused relaxation of the pelvic hgaments This hormone Hisaw named "relaun" They were able to demonstrate it in the blood serum of several pregnant mammaha, including rabbits, guinea pigs, dogs, cats, sows, and mares By injecting this substance into virgin guinea pigs in estrus, or in castrated pigs brought into artificial estrus with theelin, they were able to produce marked and easily demonstrable relaxation of the symphysis However, they showed that neither theelin alone, nor relayin without the preliminary "sensitizing" of the animal with theelin, had any such effect They thus described a synergistic one-two action between theelin and relayın The latter substance has been isolated in relatively pure form

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This one-two relation between theelin and relaxin was shown remarkably clearly by Hisaw in the male guinea pig. The pubic bones of the male are united by cartilage rather than by ligaments as in the mature female By injecting castrated males with theelin he was able to convert the pubic joint to the ligamentous type, which then responded to relayin

This effect caused by theelin with the multiplication of connective tissue elements, is probably responsible for the slight amount of periodic estrus relaxation noted in virgin guinea pigs by Brouha and Simmonet, and by Pommerenke (25) The same observation has been made in menstruating humans by Goldthwait and Osgood, and by Chamberlain The results of deFremery, Kober, and Tausk, and more recently of Tapfer and Haslhofer in producing some relaxation by massive injections of one or another preparation of the female sex hormone are also probably on this basis We also have observed this, but the slight degree of separation achieved can be greatly increased by an additional small dose of relavin, and should not be construed as evidence against the existence of relaxin

Hisaw investigated the blood of pregnant women during the last trimester of pregnancy. and failed to find the hormone He was forced to conclude either that the mechanism was different in humans or that demonstrable amounts of relaun were present only early in pregnancy The early widening shown by the x-ray makes this latter possibility extremely likely Moreover the various observations indicating the lack of function of the corpus

hormone, relaxin As further evidence they state that serum from rabbits late in pregnancy, when the corpus luteum had regressed, was much more effective in producing relaxation in experimentally prepared guinea pigs than early pregnant rabbit serum. In this regard it is interesting that, on x ray study of pregnancy humans, both Barnes and Thoms, find that relaxation first appears in the middle of the second trimester and that from there on to term it is a progressive affair However the measurements reported by Brooke Roberts and Bristow and by Ahram son Wilson and Roberts, show that widening develops as early in pregnancy as the eighteenth to twentieth week. These workers also confirm the conclusion of Heyman and Lund quist that there is little increase in relaxation during the last trimester or in labor, the maximum rate of increase being from fifth to seventh month. This early relaxation taking place during the phase of corous luteum activ ity with lack of increase during the last tri mester when the corpus luteum has regressed. point to this organ as the source of the suh stance responsible for the joint and ligamen tous changes. On three occasions pigs with this slight preliminary theelin relaxation were injected with pregnant rabbit or human serum and in each instance the degree of relaxation was strikingly increased. The hypothesized one two relation between theelin and relaxing is thus emphasized The subjective factor in palpating these

alone rather than to a new corous luteum

pigs has been ruled out as much as possible by having someone else feel the pigs Not knowing which pigs had been injected he would be given a group of animals containing some con trols. In no instance was there any besitance about picking out the pigs that had relaxed. although at times among the controls were pigs showing the slight theelin relaxation It is realized that could an objective measure ment or demonstration of this relaxation be obtained the results would be far more convincing However, the palpable increase in mobility which has gone by the end of 10 hours, is thought to represent a ligamentous relaxation rather than an actual separation of toint surfaces as shown by x ray in humans

There are both advantages and disadvantages of the use of this procedure as a test for pregnancy Its main advantage is that the test will produce results in a period of only 12 hours Its disadvantages, unfortu nately, make the procedure rather an impractical one. The pigs must be ovariectomszed, they cannot be used until brought into artificial estrus with theelin, which requires 4 to c days, blood serum must be used and preferably that in the first half of pregnancy This is made difficult by the fact that patients in the obstetrical chinic usually do not present themselves for first examination until they have approached the end of the second tra mester or beginning of the third immester Even then it is much more difficult and more bother to obtain blood from patients than it is urine. The concentration procedure requires approximately 3 hours, and the divided injections of the prepared substance an addi tional 11/2 hours Occasionally the pigs have unpredictable reactions from the serum It is hest in order to obtain accurate results that a pig be used for only one test. The reason for this is the extreme toughness of the skin everywhere except over the abdomen and this region becomes considerably fibrosed after one course of theelin plus pregnant serum con centrate As a routine test of pregnancy, therefore, this is both expensive and im practical

SUMMARS

- r A substance was demonstrated in the corpora lutea of sows and the serum of pregnant rabbits which was capable of producing symphy seal relaxation in guinea pigs in normal or artificial estrus.
- 2 This substance was first described by Hisaw and named relayin
- 3 Although slight to moderate degrees of relaxation can be produced in guinea pigs by large doses of theelin, the separation is greatly increased by a small additional dose of relaxin
- 4 Pelvic relaxation in pregnant animals is therefore not solely a theelin effect. The synergistic one two relation between theelin and relaxur is emphasized.
- 5 A procedure has been developed for concentrating human blood serum taken from

women in the first half of pregnancy which has acted on guinea pigs in a manner similar to that of relaxin

6 Symphyseal relaxation in guinea pigs in artificial estrus was produced by the sera of 15 consecutive women in the first half of preg-The serum of 1 woman in the eighth month of pregnancy and that of 2

non-pregnant women, and of 1 male were meffective

7 It is believed that pelvic relaxation during pregnancy is facilitated by, or at least in part is due to the hormone relatin and in the human species as well as in many other mammalia

8 As a routine test of pregnancy this procedure is deemed impractical

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EPIDERMOID CARCINOMA IN CYSTIC TERATOMA OF THE OVARY

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YN 1925, Gordon ably pointed out the need for a universally acceptable terminology in referring to the various cystic and solid growths arising from the ovary The names teratoma, embryoma, dermoid cyst, teratoid, mixed cell tumor, and others are used often as synonyms in articles written in the English language The European wnt ings add still more variety to this list. It would seem entirely logical to adhere to Gor don's suggestion that we follow the terms used by Ewing, Frank, Frankl, and others who refer to ovarian teratomas as being of two types the cystic or common ovarian dermoid. and the solid teratoma Graves, on the other hand does not use the word teratoma when referring to a dermoid cyst. We shall use the terms cystic ovarian teratoma as synonymous with dermoid cyst of the ovary, and solid teratoma as referring to the rarer and essen tially mahgnant solid teratoma of the ovary The solid and cystic teratomas resemble each other in that they may both contain tissues representative of entoderm, ectoderm, or mesoderm

In discussing cystic teratoma of the ovary, we must distinguish it from other dermoid tumors which are congenital sequestration tumors found at the lines of embryonic fusion, and which arise by the development and in clusion of cells of ectodermal origin

A cystic ovarian teratoma, or dermoid cyst of the on ary, is well described by Adam, and Boyd. This is a cyst occupying the situation of an ovary with a lining of cubical or squinous epithelium. It is invariably provided by a nipple like mass or process called by Roki tansky. "the insular protuberance" a structure which is regarded as representative of the head. This is the essential part of the tumor and gives rise to the various solid elements which are to be found in the cystic teratoma. The tuft of long hair commonly

From the Clinic (Ronolulu)

seen arises from this small lump and one or more teeth are often seen embedded in pieces of bone which at times have an appearance suggestive of a jaw. There is invariably a cer tain amount of semi-oleaginous material of vellowish tinge which solidifies on cooling It is produced by small sebaceous and sudorific glands which are present here as they are in normal epidermis in its proper anatomical location If one constantly bears in mind that an ovarian cystic teratoma is totipotent, that is, it may contain ectoderm, entoderm, and mesoderm, then it can be understood that thyroid tissue, mammary glandular elements, portions representing a testicle, in short almost any bizarre arrangement may concerv ably occur in such a tumor Kovacs reports a case of hyperthyroidism in a patient whose symptoms promptly disappeared following the removal of an ovarian dermoid containing thyroid tissue Pick has mentioned "hydatidi form mole like" structures in a case of der mord cyst

The origin of cystic teratoma has been the subject of much academic discussion, and it is generally conceded that neither the blasto mere theory of Marchand and Bonnet (10), nor the germ cell theory of Wilms can account for every case of this type of tumor It may well be a combination of the two ideas and there may still be other possibilities that have been overlooked as to the histiogenesis of ovarian dermoids Boesius has attempted to prove their origin by making heteroplastic and autoplastic transplants of amphibian embryos into different parts of the bodies of adult amphibians The embryonic tissues developed, unprotected by membranes, ob tained their blood supply from their hosts, and went on to develop into polycystic tumors resembling cystic teratomas in structure and composition Stout feels that this work lends support to the theory that these tumors are really an expression of parthenogenesis

Ewing scouts the blastomere or polar-body theory remarking that it cannot account for the occurrence of as many as seven dermoids in one ovary and eleven in both organs. As a matter of fact Novak has reported ten dermoids in one ovary and eleven in the other

It is possible for retroperitoneal teratomas as well, to develop from isolated blastomeres or germ cells of an accessory retropentoneal ovary. Gordon cites one such cystic ovarian teratoma which included the right kidney within its capsule. Kolb in 1909 stated that no solid retropentoneal ovarian teratomas had yet been reported. Recent literature still fails to show accounts of any such timors.

Dermoid cysts of the ovary do not seem to show any particular predilector for one side more than the other. They are usually unlateral, but are not infrequently bilateral Graves states that 5 to 10 per cent of all ovarian tumors are dermoid cysts. The incidence of bilaterality is given by Boyd and by Deaver as 10 per cent of all dermoid cysts of the ovary Gordon gives the range as "from 2 to 14 per cent", Koucky says 13 per cent, Meigs found 8 3 per cent of 60 to be bilateral, while Campbell concludes that bilateral cyste teratomas of the ovary are rare and are to be found in only 1 per cent of cases

These tumors may occur from early infancy to old age According to Polak they are the commonest ovarian tumors prior to puberty Lever reports the occurrence of a large dermord cyst of the ovary in an infant of 7 weeks, while Rossle reports a similar one in a 10 month old baby With such data, it is not too much of a stretch of imagination to consider that an ovarian teratoma could develop within the fetus prior to its birth, and that it probably did so in Lever's case Eggenberger reported one the size of a baby's head in an 8 year old child, and Puhr has recently written an account of a q year old girl who was operated on for an ovarian dermoid the size of a small child's head. The tumor in the latter case had undergone malignant change and showed adenocarcinoma as well as basal cell epithelioma

An ovarian dermoid is considered large when it reaches the size of a grapefruit Most of them range in size from that of a hen's egg to that of an orange Galabin reports the occurrence of an astonishingly large cystic teratoma of the ovary which weighed 160 pounds

Among the numerous complications which may arise from the presence of these dermoid eysts should be mentioned some which need not be associated with neoplastic changes within the tumor Torsion of the mass on its pedicle, which is apt to be long, may give rise to symptoms of tovernia due to the absorption of necrotic material Numerous adhesions may form and result in a picture suggesting acute, subacute, or chronic ileus Tuberculous peritonitis may be so closely simulated as to be climeally indistinguishable from it

About a year ago the author saw a young Tapanese woman in consultation in whom the symptoms, history, physical findings, intermittent septie type of fever, and high white cell count together with an acutely tender fluctuating mass in the cul-de-sac of Douglas led to the diagnosis of a cul de-sac abscess Posterior colpotomy yielded, first, thick malodorous pus which was followed by a stream of oily fluid mingled with hairs Three weeks later, a densely adherent typical ovarian dermoid cyst was removed at laparotomy The dermoid may rupture into the sigmoid, rectum, or bladder. In the past, the passage of hairs in the urine has led to the diagnosis Mayer's case was diagnosed on the finding of hairs in the stools

Inasmuch as tissues originating from ectoderm, entoderm, or mesoderm may occur in ovarian dermoids, various types of malignancy have been found Dougal has reported primary chorioepithelioma originating within the tumor Amann and Lorrain have found pigmented sarcomas Yamagiwa has reported the occurrence in the cystic ovarian teratoma of an adenoearcinoma such as is found in the breast Litten has found a round cell sarcoma in the wall of an ovarian dermoid, with metastases to the liver The occurrence of malignaney in dermoids of the ovary runs parallel with the incidence of malignant tumors elsewhere Koucky believes that r per cent of cystic ovarian teratomas undergo malignant alterations Goodall and Deaver say 3 per cent, while Gordon places the figure

TABLE I -SUMMARY OF RECENT CASES OF EPIDERMOIO CANCEP RECURPING IN CASTIC
OVARIAN TERATOMAS

-			Contract of the last of the la	-	*****	THE RESIDENCE OF THE PARTY OF T		COMPRESSOR AND ADDRESS.
Cae	Author	480	Pre~	Duration		Pre-operative	Treatment	
yo	year	yrs	hancies	Tumor	Pam	d agaosts	1 readment	Dutcome
44	Millot and Hinard 1934	46	•	,	4 mas	(1) Incomplete abortion (2) Myoma uteri	Left salptage-cophorectomy	Not stated
45	Earlfot and boules 1934	45	٥	,	2 7001	Uterme tomor	B lateral salpingo-cophorectomy	Re-operation in a was Enter octomy for a utrileus Death in 6 weeks
40	Cadlot and Boules 1934	19	۰	4 fhos	# Roos	Uterine sarcoma	Left salpings-cophorectomy Sub- total bysterectomy	Fatal termination experted soon
47	Denis 1935	34	7	,	2 200%	Intest nat obstruction	a stage operat on (1) closure of secal perforation and colo tomy (2) left salpengo-ocphorectomy and investmal resection	or stated Cons lered hope- less as pel as filled with recur rent mass
48	Denit 1933	64	3	c 13 yrs	ra yrs moderate 6 mm severe	Ovarian temor	Left salpings-cophorectomy Resection of sale-time	Immediate recovery Prog nous bad Follow up not stated
49	Bowles 19 d	08	•	10) 25	None	Lelt ovarian cyst () Febroid uterus (?)	Bilateral salpingo-ocoborectomy	Died 4 mouths after operation

at 3 to 5 per cent Graves remarks that there is only a slight tendency of the ovarian der mould to become malignant, as compared with the solid teratoma. Other authors including Crossen (20), Anspach and Cameron remark that these tumors are potentially malignant, and some of them undergo malignant changes.

It is well to be cautious before making and trans flat statement that a given malignant tumor has originated within the ovary. Masson and Cohsenhist have pointed out that there are three possibilities (1) the malignancy may develop within the dermoid, (2) malignancy may form in a portion of an ovary or a malignant ovarian cyst associated with a dermoid in another part of the same ovary, and (3) malignant invision of the dermoid may occur from an adjacent organ.

We have considerable evidence that malig nant tumors arising in cystic ovarian teratomas can and do metastassze as do malignant tumors occurring elsewhere. The metastasses may be teratord, carcinoma, or a simple tassue as glia only. Clark states that distant metastases as to the avillary glands are uncommon kleinkneicht and colleagues report the casof a cystic ovarian teratorias in a young woman in whom an acute abdominal crisis was precipitated by extensive hepatic and retroperi toneal tumor masses which wert apparently secondary to the oxaran tumor Unfortu nately, histological confirmation is lacking Puhr's patient, a 9 year old girl with basal cell epithelioma and adenocarcinoma occurring in an oxarian dermoid, died shortly after laparotomy with the diagnosis of hrain tumor Autopsy showed extensive metastases to the spine, cranium, and other bones. It was be heved that they originated in the oxarian dermoid hut again histological evidence is lacking. Krukenberg, Ascaulo Viarez, and Counseller have reported cases of oxarian dermoids containing squamous cell cancer which had metastasized to the liver.

Most cases of malgrancy occurring in oarana dermoids are epidermoid carcinomas of the squamous type. In 408 such cysts at the Mayo Clinic between 1912 and 1931, 70 if 7 per cent, were proved grossly and micro scopically to be associated with primary epideliona of the epithelial elements of the cysts. Frank states that the carcinoma takes the form of ripe squamous epitheliona with pearl formation. Even though the pearly bodies are usually present, it is not invariably so as can be seen by examining the reports of Masson and Ochsenhirt, who have shown some of the epidermoid carcinomas to contain

more youthful squamous cells without pearl formation. Gordon gives the percentage of epidermoid carcinoma in malignant tumors originating in cystic teratomas of the ovary as from 3 to 5. Out of 60 dermoids of the ovary, Weiner found 3 specimens, 5 per eent, to show epidermoid carcinoma. Surely a careful examination of all ovarian dermoids removed at operation would show many more instances of malignancy than are being reported.

Meigs issues a warning note pointing out that simple dermoid cysts of the ovary may show epithelium which looks like carcinoma but is not. He considers that the presence of malignant areas in a dermoid does not necessarily mean a had prognosis as much depends on whether the growth has perforated the

eapsule and invaded the peritoneum

The age incidence of epidermoid carcinoma in eystic ovarian teratoma parallels that of this type of eancer in other portions of the body It seems reasonable to expect that the younger the patient, the more rapidly fatal the outcome The three youngest authentie cases of squamous cell cancer in ovarian dermoids to be reported in the literature are those of Caillot, Reppun, and Bierman The patients' ages were 19, 20, and 21 years, Bierman's patient was not respectively operated on but died on the third day after examination, and necropsy revealed extensive invasion of the bladder, rectum, uterus, and left ovary (the primary tumor was in the right ovary) Squamous carcinoma cells with epithelial pearls were found in profusion Reppun s patient died 3 days after operation The rectum and sigmoid were extensively involved Caillot's patient was still living a few months after operation but the prognosis was regarded as hopeless as an absolute extirpation was impossible due to infiltration of neighboring viscera

In the series of cases of epidermoid caneer in cystic ovarian teratomas reported by Masson and Ochsenhirt, the results were recorded in 18 Death followed from recurrence in from a few days to 2 years after operation in the majority Lapouge's patient lived 7 years and died of abdominal recurrence. Ludwig's patient was well at the end of 2 years but

further report is lacking Masson and Ochsenhirt have reported 1 of their cases to be well at the end of 5 years Counseller's patient was reported to be in good health 15 years after operation

In addition to the squamous cell types of caneer found in dermoids of the ovary, typical basal cell cancers have been reported by Spaulding and Puhr Puhr's case was also

associated with adenocarcinoma

To date there has been no satisfactory method of early diagnosis of malignancy occurring in a dermoid We should strive, however, to attain greater accuracy in the diagnosis of pelvic tumors. Numerous articles have appeared attesting to the value of roentgenographs in the diagnosis of ovarian dermoids Among these should be mentioned papers by Aime, Eideken, and Spillman In interpreting the films it should be borne in mind that a single tooth lying in the line of the ureter may be confounded with a ureteral calculus Spillman and Knox, have remarked on such a possibility, and Sonntag cites a case in which a tooth was mistaken for a stone in the ureter. Alexander refers to a similar ease in which a second pieture taken from the side threw out the tentative diagnosis of ureteral stone In our case, the report of which follows, we failed to have made roentgenograms of the pelvis, and hence the dermoid cysts were not diagnosed until operation

In addition to the dangers of metastasis in these tumors, we have to deal with those associated with the infiltration of adjacent organs by the tumor mass. Acute intestinal blocking may precipitate an emergency as did Denis' case, a patient aged 34 years. Forster's patient showed extensive invasion of the ileum with pearl formation in the cyst as well as in the intestinal wall. Fairbairns' patient had extensive bladder involvement, and Millot and Denis, bave reported severe uter-

ine bleeding in their patients

The ideal treatment of all ovarian dermoids, whether they appear beingn or malignant, is still total and clean ablation whenever possible and as soon as possible as urged by Senn in 1895. One should never temporare longer than is absolutely necessary if the patient is

in any condition to permit operation. When complete removal is impossible, one must attempt to relieve intestinal obstruction by whatever procedure seems to promise the most relief in that particular case. Colostomy may sometimes be necessary. In extensive bladder massion, it may be imperative to give temporary relief by transplanting the urcters into the lower large bonel, or it that is impossible to the abdominal walls to per mit external drainage of the urine. Hysterectomy is often necessary.

Many of the patients who have had dermoid cysts of the ovaries have had several normal pregnancies. Our patient aged 68 years when she consulted us for the first time, had had two uneventful pregnancies and delivences in spite of bilateral cystic ovarianteratomas. Perusal of the literature yields the record of only one other case resembling ours in that both ovaries had been replaced by cystic teratomas only one of which had become the site of squamous cell carcinoma. This was reported by Krukenberg in a woman 43 years of age. No references have been found of bilateral ovarian dermoids both of which have become malierant.

Counsiller in 1934, reported the fortieth to the fort; third cases of cystic orarian dermoid to undergo intrinsic changes due to squamous cell carcinoma. Since then 5 other authentic cases have been added. These have been reported by Millot, Caillot (2 cases), Denis and Duffant. Ours therefore makes the forty minth. A resume follows.

Mrs I I Japanese aged 68 years, was admitted to Queen's Hospital September 13 1936 complain ing of constipation low sacral backache and a large lump in the lower left abdomen

About so years ago she first noticed a lump in the lower left abdomen. It was about the size of a base ball at that time. It has slowly enlarged until last year since when the enlargement has been more rapid. There has never been any pain in the region of the hump nor any thing, but a feeling of heaviness. The appetite has almost better legislated the seventh of the properties has almost been more developed insidiously and have slowly increased. The sluggishness of her bowels is the most distressing symptom.

She has never been ill nor has she been to a doctor until now. The menses have been regular until menopause 10 years ag.) She has never suffered from dysmenorrhea. The family history is pricletant

She smokes eigarettes heavily but uses no alcohol Physical examination revealed a shrunken Japa nese woman of about 70 years She did not appear critically ill or in any way suffering Her tempera ture was 98 z, pulse 76 respiration 18 The only positive physical findings were (1) bilateral circulus senilis, (2) sluggishness of direct and consensual pupillary reflexes, (3) moderate deafness both ears (4) a few teeth missing (5) slight gingivitis (6) bearing pulsation both sides of neck (7) a few firm enlarged lymph nodes both sides of neck, freely movable (8) lungs moderately hyperresonant throughout (9) abdomen enlarged to size of 5 month's pregnancy most of the mass to the left of the midline where a large hard rounded tumor could be felt. It seemed to be attached firmly on its under surface to the subjacent structures. It felt smooth and rounded but no fluctuation could be elected. It was not tender on firm pressure but the patient winced when the tumor was pushed very far to either side The anterior part could be moved but the base seemed fixed Other abdominal find ings were negative (10) The uterine body was not distinct and seemed to merge nith the tumor mass There was a firm rounded fullness of right adneral region but no tende ness. The entire left that fossa was filled with the large tumo. No tenderness was noted in the lift formix (11) The extremities were poorly muscled

The blood Wassermann and Kahn tests were negative All other tests were within normal limits for a noman of 68

The pre-operative diagnous was left ovar an cost or large myomatous uterus possible left renal

Operation was done under neocain intra pinal anesthesia ha additional anesthetic vas recessary On incision of the peritoneum a small amount of free straw-colored fluid was seen and was remo ed by vacuum suction. An elliptical tumor the size of a full term fetal head was no v encountered the presenting surface of which was smooth and a beautiful lemon vellow in color suppesting a layer of thick cake frosting This tumor lay in the hollow of the left sleum and was densely adherent to the fascia on the under side of the tumor. It displaced the descending colon and the sigmoid nearly to the mid line of the abdomen and was densely adherent to their lateral surfaces Although there were obvious patches of thickening and induration in the tumor these were all smooth and no irregular papillomatous or fungating areas were found on its outer surface The tumor felt like a cost under marked tension The lower pole connected with a wide band of tough tissue which formed a pedicle representing the left adneral attachments to the uterus The tumor mass was freed first on its under surface working me ial from its lateral boundaries. Having freed it from its bed we were now able to flip the tumor over in a counterclockwise direction to the midline of the abdomen The adnexal pedicle was severed and heated, and the mesial side of the tumor, adherent

to the sigmoid and descending colon was freed by careful blunt dissection. In allowed the tumor to be removed. A raw bed remained. It did not bleed, and was left alone as no tissue was available with which to cover it. The extirpated left ovarian tumor measured 19 by 16 by 14 centimeters. Later, it was found that its walls were i millimeter in thick ness at the thinkest. It was also found to contain several large loculations filled with semi-solid lard hike material and many long black hairs. Rokitansky's in sular protuberance was clearly demonstrable in the largest loculation. It was roentgenographed after removal and two small plaques of bone were clearly visible.

Another adherent cystic tumor arising from the right ovary was next removed from the right iliac fossa Despite precautions, this ruptured during its extirpation It was found to contain oily fluid, hairs, teeth, and bone. The entire sac was removed and the raw surface partly peritonealized. The abdomen was closed without drainage Crossen, Ashton, Bovee, Doven and others warn against the dangers of spilling the fluid from these dermoid cysts. It is said to be very irritating and may produce a serious peritonitis. The literature is strangely silent as to exactly why this fluid should be so irritating in the absence of infectious organisms. Our cultures taken from this spilled fluid were negative. Senn has remarked that aside from the irritation alone and the resulting adhesions, the spilled contents may produce large numbers of secondary growths the most of which are the size of a cherry These are each furnished with a tuft of lanugo like hair, and occur in clusters or imbedded in adhesions

The first 4 days were stormy but the patient left the hospital on the sixteenth postoperative day in good general condition with a firm scar

Three months after operation, she was up and about having no complaints except occasional low sacral backache which was relieved by small doses

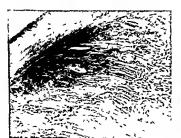


Fig 2 Low power magnification of section near wall



Fig I Gross appearance of carcinomatous dermoid cyst of left ovary

of codeine and aspirin Bowel action had improved and she required only occasional mild lavatives

Since the capsule of the large left or arian cystic teratoma was definitely broken through on its under surface making the total ablation of the subjacent tissues impossible, the patient was not expected to survive for long. She died in the country 4 months and 4 days after the operation. Unfortunately, we were informed too late to obtain an autops. Her sons stated that she had had no further trouble from consupation though her backache persisted until death, which was a gradual one. The patient weakened from day to day for the last 2 weeks of her life.

Histological sections were prepared from pieces of tissue excised from the notched area appearing just above the ends of the short ruler in the photo graph, and also from the under surface which does not show. The picture shows the undulations pro



I ig 3 High power magnification of section near wall Note mitotic figures

duced by carcinomatous patches in the tumor wall Hair and caked fatty material can also he clearly

SUMMARY AND CONCLUSIONS

It is suggested that we adhere to the ter minology of Ewing, Frank, and others in dis cussing ovarian teratomas, dividing the group into solid and cystic teratomas. The latter is used synonymously with the term dermoid cyst of the ovary

Lither type of teratoma may contain tis sues representing ectoderm, entoderm, or mesoderm Hence many bizarre arrangements occur

The essential part of an ovarian dermoid is

the 'insular protuberance' whence the solid elements of the tumor arise

Opinion is still divided between the blasto mere and the germ cell theory of origin of cystic teratoma of the ovary

Tive to 10 per cent of ovarian tumors are said to be dermoid cysts. Various authors state that bilateral ovarian dermoids occur in from 1 to 14 per cent of cases Cystic teratoma of the ovary has been reported as occurring between early infancy and old age. It is the commonest ovarian tumor that is found prior to puberty

Numerous complications may result from ovarian dermoids among which are intestinal obstruction of varying degrees, toxic symp toms due to torsion of the tumor on its pedi cle, infection and peritonitis, uterine hemor rhage and malignant degeneration of the

tumor

The incidence of malignancy in cistic teratomas of the ovary runs parallel with malignancy elsewhere in the body Figures of various authors vary, thus anywhere from 1 to 5 per cent of all ovarian dermords have been shown to be malignant. They are all poten tially malignant

Caution must be used in making a definite statement that a given malignant tumor has originated within the ovary. It may have arisen in another part of the ovary and ex tended into the dermoid cyst or the invasion may have occurred from primary malignancy in an adjacent organ

Most malignant tumors occurring in ova

rian dermoids may metastasize. The liver is frequently involved

Of all the possible types of malignancy that may occur in an ovarian dermoid, squamous cell carcinoma is the commonest (3 to 5 per cent) The prognosis is gloomy in most cases if the capsule has been broken through and peritoneal invasion has occurred

Roentgenographs of all ovarian tumors would add to the accuracy of the pre opera

tive diagnosis

The only satisfactory treatment of ovarian dermoids is early and complete removal of the tumors Any patient who is a good risk should receive operation

Since Counseller's report in 1931, 5 addi tional cases of epidermoid carcinoma originat ing in ovarian dermoid cysts have been reported, bringing the total of authentic cases up to 48 The author wishes to add 1 more case to the list, bringing the total to 49 Death occurred in 4 months after operation, in this last case

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CLINICAL SURGERY

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THE PROBLEMS OF UNILATERAL HARELIP REPAIR

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HERE are few conditions in which the possibilities are so little realized as in the renair of harelins. The average repair of a harelin leaves a child so marked that it is perfectly evident to invone that the in dividual is not as you and I If we were to analyze just why we know the person has something wrong with his face we would undoubtedly find it difficult to say where the fault is Nevertheless. if you reflect that all of us can recognize countless individuals entirely by their facial make up, it becomes evident how very sensitive the human eve is to only the slightest differences in facial ensemble

The ideal then, in repairing a harelip is to produce a face which will to the casual observer, bear no stigmas of the original fault. This I may say is a most difficult task and a result not often ob tained but by dint of hard work and experience, a thing which can be fairly closely approximated To the highly critical eye none of them will be perfect but some will be acceptable

I think that the secret of such an acceptable result is that the face be normally contoured. By this I mean that the features of the mid face he in correct proportion and position, and above all symmetrical For there is nothing more obvious than an abnormality due to asymmetry. Scars can be forgotten if the lip and nose are symmetri cally assembled, but if they are not, our eye immediately dissociates the component parts and the lip and nose unfold into the original condition If one can stand a few feet away, so that the scar is obliterated and not be conscious that some thing is wrong with the nose or lip, then the result is probably as good as can be attained by am means of correction which is at present at our command

The deformity I like to consider a harelip as presenting three separate deformities. First, the separation of the maxilla, which may vary greatly There may he in slight notching of the lip a nor mal contoured maxilla with the only fault being absence of the lateral incisor tooth in line with the



Fig 1 Rose type of operation The incl jons 4C and A C are equal in length and to the desired vertical height of the lip BC equals BC Thompson type of operation 11 is the desired vertical height of the new lip Z I is the measured width of the vermilion 4B equals 1B equals 1Z BC equals

BC equal ZV Fig. 3 Mirault type of operation 4 is placed on muco

cutaneous line at point where the line through the base of

greater than the desired vertical beight of hip because this line will pass obliquely from nostril to mid point of lip when repair is finished. B : half way between 4 and C4BC equals 4BC and is planned so that point meets point CD equals CD' and when completed passes obliquely across vermilion in reverse direction to 4BC This staggered effect helps to di guise the scar There is less material sacrificed by this plan than any other



Fig. 4. This child was 4, months old when operated on Photograph at left was taken the day before operation and shows that there is merely a tiny cleft in the vermilion, hardly even a scar extending up into the tip proper. The nose is normal At right, the child 3 months later. The lip is good. This was done by just making a Vireshening of the cleft and suturing it with a little fullness of the lower edge of the vermilion. This child is shown to illustrate the fact that even as simple a notch as this can be made more pronounced by an operation which does not leave a fullness at the suture line. I have now come to believe that it is better to leave an excess and later excise it horizontally to get a smooth lip rather than run the chance of the notch recurring as the var contracts. In this child, the fullness left just took care of the contracture.

cleft there may be only slight indentation of the inferior edge in line with the separated lip, and so on until we reach the most marked deformity with wide separation of the maxilla and forward projection of the premaxilla on the uncleft side

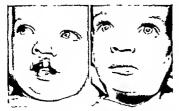


Fig. 6. A ro months' old child with an incomplete cleft of hip. Notice that although the cleft extends only about half way into the lip, the nostral above it is broad and flat and the columbla is obliquely inclined to the mplt. This is practically always '0, and must be corrected. The mavilla is only partially cleft, but the left mavillar vecentral mesor due to there being no lip over it, has grown in a rotated and angulated position. In the repair this tooth was extricted and the nostril narrowed. At right photograph 1 car futer but that the two mates are not of the value configuration. This is because the lower end of the left als was not rotated inward, but was brought directly across.



Fig. 5. Left, the pre-operative photograph of a months' old haby born with an incomplete harding. There is also a partial cleft of the maxilla. The palate is normal. This illustrates again that the nasal deformity is practically always present even though the cleft of the lip extends only about half way into it as shown here. For some reason I did not get this nasal deformity corrected at first operation. When the child was a year old, a diamond shaped piece was removed from the floor of the nostril and lip, so that the columella and ala were brought into approximately normal position as shown in right photograph. The mother says that now she has practically forgotten that her child had ever had a harelip whereas before she was constantly being asked by her friends why the buby's nose was deformed.

Second, there is the cleft in the lip At first sight, it would seem that these were all alike, varying only in whether the split extends completely into the nostril or only purt way through the lip. This is true for the most part, but in a good many instances there is considerably less available vertical length of lip on the cleft side.



Fig. 7. Left photograph shows a 3 weeks' old infant with the chiracteristic deformity of an incomplete cleft of the hip, but a complete cleft of the maxill. At right 6 months later is shown the result obtained by the Mirault operation. Notice the normal nose with no flattening the ala curls in wird at the bottom, and the columella in midline. This is one of the cises recently done, and in which a crescentic excision of skin was done on the superior aspect of the all to correct overlang is advocated by Blair. When the right picture was takin, the arch was already normally contoured.



Fig 8 This case is shown to bring out two points First that even though repair is done late the cleft in the jan will usually be closed by the growth process when the molding pressure of a lip is over it. Second that unless the soft parts are draped in normal fashion over the under lying bony and cartilaginous framework there will be no tendency of the nasal delormity to correct itself Left Condition when the girl was presented at the age of 2 years The nasal obliquity is marked and the jan cielt is wide onen Right 6 years later. The alveolar ridge wide open Right 6 years later. The alveolar ridge although it does not show in the photograph is recon stituted and there are teeth in it which occlude well. This has occurred following original repair of the lip at which time nothing at all was done to the bony cleft. Moreover a lateral view shows normal position of the upper face with relationship to the chin. The nose however I did not get in midline of the face and it is still inclined a little to the left and the right nostril is not symmetrical with the left This deformity of the nose could and I think should be cor rected but the family are satisfied. When the girl gets of age she probably will want something done It is my ex perience that parents oftentimes prevent deformaties being corrected which the patient when he can make his own decisions is anxious to have eradicated

than on the uncleft This should be carefully looked for and be considered in the repair, for a slight discrepancy in vertical height of the lip on the two sides 1 e, distance from ala to mouth line, is quite noticeable in the finished product

Third, the deformity of the nose, is, I feel, the most important of the three and varies most widely. There is in all umlateral harelips except ing those which are barely notches in the lip hine, abmormality in contour of the noistin on the affected side as well as malposition of the nose as a whole. The nose is shifted to the side opposite the cleft. The columella lies obliquely inclined from above downward toward the sound side so that a line through the base of the columella noist in the horizontal plane, but an oblique one. The noistin in the extreme case may be drawn out mid affat line with the hining of the nares in its lateral aspect flush with the cheek, and hy surface, and in such instances, may be mistaken as a part of the



Fig o This infant was 7 weeks old when first seen. His doctor wrote to me when he was 6 weeks old asking how soon the lip should be repaired as he was under the impression that one waited until the child was 2 or 3 months of age before doing anything Left photograph was taken a days before operation the child being 9 weeks old One notices that this is a cleft of hip and marilla without cleft of palate There is rather marked projection of the pre matilla. The nose is fairly well in the midline the obliq usty being mainly in the columella. The left ala is of the flat type with a rolling out of the outer portion so that one is actually looking at masal lining. I think that this fact is often not appreciated so that in the repair this lining is brought over to the columella rather than being rolled in ward alter coroplete mobilization and the true base of the ala brought inward in normal position. In repairing this the maxilla was molded inward by digital pressure. Both cheeks and columella were loosened subperiosteally from matilla more so on left through intra oral incisions. The lelt ala was cleanly cut from its lateral attachment up to the nasal process. I tried in this child making an incision along the left base of the nasal septum. I reeing the murosa and suturing the cut edge of lining of left ala to this. The hip was done by a modified Mirault operation but as one can see in right photograph at age of 7 months this mad the left nostril too small although well shaped and in cor rect position The obbquity of the nose is corrected. The lip is not good the vermilion being poorly matched and rot even The arch at this time was perfectly normal in con tour The lip should and will be readjusted. If one meas ures from ala to lip there is a shorter distance on the left This is not very noticeable but is a fault of the Mirault operation which I have found hard to overcome

httle form almost blending with the cheek

The repair. The successful repair of a hardpinus to vercome the abnormalities mentioned. The cleft in the bone can be disregarded, for there are very, few jaw splits which will not close from the pressure of the repaired lip and its constant muscular play, even though the repair is done relatively late (Fig. 8). The so called Brophi operation, actually done years before Brophy spopul alization of it, is unnecessary and deforming. The wring of the jaw split destroys or deforms tooth buds often causes later retrocession of the upper face, and is, moreover, attended by some



Fig. 10. This child is shown to illustrate the fact that the Rose type of operation gives a lap which is too long in the vertical plane. I call them 'horse laps' 'A sean be seen ileft photograph, the deformity is a right, unilateral cleft of lip, jaw, and palate. There is not very much nasal obliq uty. This case was done some time ago and a prehimmary wring of the upper jaw was done at age of 2 months. When the minant was 4 months old the lip was repaired. When 2 years of age the palate was repaired by the Langenbeck procedure. Right, Photograph showing the appearance at 2 years. Fortunately, there is no retrocession of the maxilla. I no longer use the Brophy wring depending on the repaired lip to close the jaw cleft as the child grows which it practically always does.

hazards (Fig 15) Although I am perfectly well aware that very few men doing oral and plastic surgery any longer use forceful closure of the alveolar cleft, I do not feel that I am jousting with windmills in bringing up this point, for the rark and file of surgeons still do I still see children



Fig 12 The baby, as can be seen in left photograph is one of the type that just missed baving a double hareling. There is a complete cleft of lip, Jaw and palate on the right not the left there is a notching on the lip, and a unson's scar extending up into the nostril. There is the usual drawn-out also on the right with obliquity of the columella Repair was done at 7 weeks and mit photograph shows and the right with the lip is a large proper and the right with a large property of the columella notch is the incomplete cleft on the left, and will be smoothed out at the time of palate repair.



Fig. 11. This is another of the wide open clefts of lip jaw, and palate. The deformity is of the same type, although not quite so marked as in Figure 14. The iming of the ala on the cleft side is not faring outward as much Right photograph shows a good result from the Thompson type of operation. The ala has been rotated in correctly, but there is an overhang of the superior part of the alar cartulage. This probably could have been corrected by a crevenute existing of skin just above the overhang, as recently advocated by Blair.

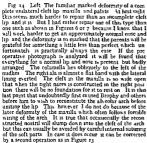
brought for correction of a backward displacement of the upper lip due to closing forcibly the alveolar cleft in infancy. It is an extra, unneces-

sary, and harmful step in the repair of a harelip Strange to say, the cleft of the lip which most pecple would say is the conspicuous part of the



Fig. 13. The baby's parents had been adused by their family doctor to "hait awhile" before having the lip repaired so that when I first saw the boy, he was 8 months old. The deformity as shown in left photograph is a very marked one. I closed the hip over the wide open premardla by a Thompson type of operation. This worked excellently for about a weeks, and then the all slipped down into the bony cleft. This occasionally happens in spite of every effort by careful suturing to prevent it. I repaired the palste at 18 months and at 2 years of age corrected the massil deformity which had resulted from the all slipping at original operation. In spite of the delay in hip closure, the alvoclar ridge is normal in contour. At right, 2 weeks following final operation on the lip, the recent suture line is visible. This will disappear in a few months.





In this case after digital molding of the matulla a wide mobilization was done on both ander on the clieft side practurally in the rim of the orbit. In these mobilizations one often west the infra orbital nerve plundy and I often sacriner it it is seem to hold the check. Incusors of a modified in the control of the check in the check of the check in the check of the check in the check of the check scar is still prominent. The nose is about as good a one gets. The north is correctly shaped the alia curves in normally and the floor of the nares is at the right level. The columbia is currely in the madien. The his is not other note is equal to the most difficult part of this type of repair.

deformty is the least difficult to repair accept ably. There are certain points about it which should be kept in mind, and if these are paid at tention to a fairly normal lip should be obtained. These are. The vertical height of the lip on the two sides should be equal. This height should not be too great, or an martistically long upper lip will be the result. The vermition edge should meet smoothly on the same plane. The 'mouth line" (uncution of hips when closed) should be



Fig. 1. The way a child should and should not look fol lowing repair of a unilateral harelin Left Infant 6 months following simple closure of hip over a wide open alveolar chift Notice the normal full pouting lip of a baby The alveolar cleft has clos d leaving the normal haby arch Right A child 7 years old as I first saw her She had been operated on five times. The marilla is markedly retro-cessed. Many of the upper feeth are absent and those that are present are malformed The upper lip is drawn tightly across the small upper jaw The right side of the nose is completely obstructed by a deviated aeptum This is 50 marked that the right nasal bone is actually being shoved outward This is all due to loss of maxilla either from forceful closure of alveolar cleft or actual excision of bone in infancy The five previous operations and the four which I had to do to make her somewhat presentable could all have been avoided by a simple closure of lip in infancy in accordance with the physiology of growing in fant bone Moreover the end result would have been

smooth without notching or an excess ' blob' at the suture line

A considerable number of operations have been devised in the past for harelip repair. The most common of these are the Rose, Thompson, Owen, and Mirault operations. I have used all of these except the Owen operation. They all have some inherent defects in plan.

The Rose operation (Fig 1) is the simplest of all As shown in the diagram, it is a simple cut ting away of the vermulion surfaces of the cleft along with considerable up tissue. The points to be kept in mind in making these incisions are that the two sides be equal in length that the finished distances AB and A'B' are equal, that the cuts across the vermilion BC and B'C' are equal, and that the point at which the cuts are widest apart be equal in width to the cleft The inherent fault of the operation is that it usually produces an upper lip which is too long to be artistic in proportion (Fig 10) And I feel that any repair that leaves a straight vertical scar down the hp, leaves more of a stigma than one in which the scar is oblique or staggered

The Thompson operation is also simple to execute (Fig 2) It is based on principles similar to those of the Rose operation. It recognizes that equal vertical height of the two sides of the lip is essential, and attempts to obtain this by accurate measurements

The points A and A' which are to be joined to form the floor of the nostral are marked From these approximated points a measurement is taken vertically downward, so that the point λ lies on an imaginary line which would complete the natural curve of the lip Using this measurement minus ZX (the width of the vermilion) the points B and B' are marked at junction of the skin and mucous membrane The points C and C' are then marked so that the angle ABC is about equal to or less than 90 degrees and BC equals B'C' This gives raw surfaces which are exactly equal and moreover equal to YX

The fault of this operation in my experience is that although easy to carry out, it usually produces a lip which is too tight along its lower border Moreover, it does not provide an adequate nostral floor and with subsequent contracture of scar, the nostril is pulled downward

The Mirault operation (Fig. 3) as originally devised consisted in the principle of turning down a small flap of tissue from the cleft side of the lip into the middle of the finished lip. This principle bas been criticized at various times because it displaces muscular tissue into an abnormal position, and from this, it has been argued that abnormal expression would occur on muscular movement In practice, I have never seen this occur The operation, I think, is sound because it sacrifices practically no tissue, and instead, places tissue which is usually sacrificed in other plans in the position where it is most needed, namely, along the lower border of the lip It thus produces a lip whose vertical beight is more nearly normal than any other plan, and which is not tight along the vermilion line It also conserves tissue with which the nostril floor can be reconstructed

The diagram (Fig. 3) is self explanatory. The distance AC is measured, so that it is a little more than the desired vertical length of the lip It is then divided by placing the point B half way between A and C The line A'B'C' is made equal to these distances D and D' are placed so that the distance CD equals C'D' Both are cut obliquely The two incisions then fit together like a jig saw

puzzle, point to point

The operation has been refined by Blair especially to take into account the nasal deformity I have found two difficulties in his plan. It is difficult to produce a smooth vermilion line and to prevent the vertical height of cleft lip from being less than of uncleft lip is a problem

The nasal deformity I have come to feel that the problem of repairing a harelip is really one of producing as nearly a normal nose as possible When one considers that the nose is the most prominent feature of the face, and that slight deviations from the normal are extremely noticeable, this point of view I think will be justified To be an acceptable nose, the following things must be so The nose as a whole should he in the midline, the columella must be vertical to the mouth plane, the nostril floors should be on the same level, the nostrils should be approximately the same shape and size, and for this to be so the ala must curve inward at its base, with no overhang or buckling of the superior alar border

To accomplish such a result is not always possible, but one to be striven for In order to correct the nasal deformity, there are certain things which must be done Unless the cheeks and alæ on both sides are completely loosened from the maxilla, it is futile to attempt to correct the deformity. The columella must also be loosened from its bony and cartilaginous support The shape and position of the nostril depend upon the points on either side of the cleft selected for approximation, and the floor of the nostril will be correct if tissue is saved

with which to construct it

OPERATIVE TECHNIQUE

Ether vapor fed through a book in the corner of the mouth is the most satisfactory anesthesia The terrain is then carefully surveyed and the incisions planned Of prime importance is the selection of points A and A', for on their proper placement depends the final configuration of the nose A is placed on a line passing obliquely through the base of the columella and perpendicular to a line bisecting the columella longitudinally Its exact location on this line requires some con sideration, but is usually just inside the mucocutaneous junction A', I believe, is often wrongly selected especially in those instances where there is eversion of the alar lining. It should be just inside and a little below the true lateral border of the ala If these two points are selected correctly on approximating A and A', the ala does not look as though it had been dragged over to meet the columella, but will curl inward in normal fashion

When determined, these two points are temporarily tattooed in the skin with methylene blue on a needle. The denuding incisions are then planned and measured, always with the thought in mind that the two sides must be equal in length and equal to a line dropped vertically from nostril floor to lip on the sound side These incisions (or points along them) are tattooed in like manner

The next step is freeing the cheeks, alæ, and columella from the framework. This is done through intra oral incisions on either safe. I would like to emphasize that this mobilization must be done on both sides, and not just on the cleft safe, otherwise a nose displaced from the midline will result. The greater the deformity, the wider the freeing of soft parts must be, bleed ing from this step should be controlled by warm packs and pressure. When the soft parts have been so loosened that the nose can be correctly oriented and cleft edges approumated without any tension, the mobilization is considered sufficient.

The next step is making the lip incisions. The direction and course of these depend on the plan and type of operation They are made with a sharp, pointed knife inserted perpendicularly through the lip On the medial side of the cleft. the incision is made from above downward to the vermilion border, all the vermilion being left attached until decision is made as to bow much of it will be used. On the lateral side, incision is made from A' to vermilion border and then along mucocutaneous line upward until the knife emerges in the cleft. This leaves all the lip tissue attached as a flap to ala and vermition to hip It is important to conserve all tissue until the lip is approximated. The ran edges are now approximated by a trial suture placed at 4-A' flap of lip tissue attached to ala is rotated upward and trimmed to form the floor of the nostril The vermilion flaps are trimmed to form the hp If any change in plan is necessary, it is made at this time before the conserved tissue is trimmed Approximation is done with interrupted silk tied on the mucous surface, and interrupted horse hair on skin surface Silk bas enough tensile strength to hold the repair securely while horse hair causes little skin scar A Logan bow is kept on for a pe riod of from 10 to 14 days to keep tension off the bealing wound

POSTOPERATIVE CARE

These infants are always grouped and matched before operation and if condition at end of operation seems at all doubtful a small transfusion is given immediately. Feeding is started as soon as the infant is conscious. This is given with a medined to prove If there is any weight loss due to taking formula poorly for the first few days, small soline infusions are used to keep up body fluids.

After various ways of caring for the hip were tried, the following simple method was colved No dressing is used. Handa are restrained. For the first few days as crusts of dried blood form they are removed with bydrogen perovide. If there is any redness along the wound, tiny songies soaked in warm saline are placed on the hip frequently. The skin sutures are removed in 42 hours to prevent scarring. As soon as these sutures are out, zinc outde outlinent is applied to the hip twice daily. The hostifis are kept clean with tooth pick swabs. The Logan bow is left on for 2 weeks, and the internal silk sutures are not removed until the third week. Feeding from the bottle is started after final sutures are not

The baby is sent home with no instructions to the mother other than those of feeding. The baby should be seen every few months for a year and a half, and if any secondary corrections are necessary, these should be done before haved de formutes result. Orthodonius is practically always necessary later, as the upper incisors tarely are in normal position. Most of these children have some deviation of the neast speptim with obstruction to breathing on side opposite the cleft when they get their growth. This can be attended to them.

THE OPTIMUM TIME FOR OPERATION

There is rather general agreement that barelips should be repaired as soon after birth as possible Many men believe that operation should be earried out within the first 48 hours after birth am not in quite such a rush as this I think the optimum time depends more on how the baby takes feedings and gains weight There are a few babies who nurse poorly and fail to gain until the lip is repaired Most of them have difficulty for a week or so, but soon learn how to suck a large nipple with big holes successfully. If the baby thrices, I would just as soon wait until 4 to 6 weeks before operating. There is less operative mortality and more lip to work with at this age The premaxilla will still be successfully molded hy the hp even after 2 months However, I see no point in waiting more than 6 weeks, and feel that the family physician should instruct the parents to have repair done in the first month

The child should be in good physical condition, especially the upper respiratory tract, before operation A running nose is a definite contra indication to repair. Blood should be available for transfusion as it is occasionally needed immediately after operation.

REPAIR OF TRAUMATIC FISTULAS OF STENSON'S DUCT

HAROLD GLASCOCK, MD, and HAROLD GLASCOCK, Jr, MD, Raleigh, North Carolina

HE repair of fistulas of Stenson's duct comes to few surgeons who do not deal with large numbers of traumatic cases. Yet it is a problem which may suddenly confront any surgeon. It is fortunate that accidents to Stenson's duct are not frequent hecause its repair is difficult and cosmetic effects must seriously be considered.

The following case is heing reported hecause we have had excellent results with a modification of the technique described by Homans We are familiar with the technique of end to-end suture by extension of the incision along the duct as well as the various techniques of Kaufman, Nicoladoni, Braun, and Langenheck. All of these usually produce large scars in addition to the lesion already present. Our method is not radically new, hut we helieve that may serve well in those cases in which early operation follows division of the duct.

Our method consists of passing a metal prohe from the hucal opening through the distal portion of the severed duct, the prohe coming out through the wound in the face (Fig. x). A thread is then wrapped around the end of the probe, hoth ends of the thread heing left long. The prohe is pulled hack through the duct, thus drawing the loop of thread into the mouth. The end of a piece of extra coarse silkworm gut is then bent and hooked into the loop of the thread and the thread is then pulled back through the distal end of the duct, the silkworm gut heing drawn with it.

The patient is given lemon juice to stimulate the flow of saliva and in this way the prorumal end of the injured duct is found. The same probe is inserted into the provimal end of the duct, passed to the parotid gland, and forced through the substance of the gland. Where the probe points the skin is incked sufficiently to come through to the surface. The thread is again wrapped around the probe and pulled through the prorumal end of the duct to the wound. The same piece of silk worm gut is hooked in the loop of thread, and the thread is drawn through the provimal end of the duct and parotid gland, the silk worm gut being pulled with it. This places the silk worm gut being pulled with it. This places the silk worm gut being pulled with it.

duct and the parotid gland To hold the silkworm gut in place, a shot is applied at each end The wound in the face is sutured tightly with horsehair

The wounds are cared for in the same manner as are any other wounds of the same nature. The silkworm gut is left in place for a period of 4 to 6 weeks, thus encouraging the formation of a wide channel.

Following is the report of a case

CASE REPORT

G I, negro male, aged 30 years, received a vertical laceration about 3 centimeters in leight on the left side of the face just below the malar eminence. The wound bled eather profusely. He was taken to the hospital Hemornage was controlled by means of ligatures and the wound was closed with the hope that the duct had not been in jured. However, the following day the patient reported that the dressing became very wet following each meal

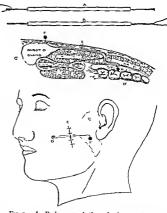


Fig 1 A, Frobe passed through duct with thread wrapped around the end to be pulled through the duct 8, Silkwarn gut hooked on the thread to be pulled had known by the duct C, C', Parotid gland D, F, and D', F, Shots on the silkworn gut which has been passed! through the duct and the parotid gland E, Sutured wound

Hence injury to the duct was established beyond doubt. It was decided to allow the wound to heal and see if the fistula would close of its own accord The seromucous discharge continued and surgical repair was decided upon The existing wound was opened under local anesthesia and the technique described was carried out. Saliva began to follow the all worm gut into the mouth almost immediately No saliva came through the proximal opening in the skin behind the gland and very little through the re paired fistula site. There was only slight interference with the patient's comfort. The silkworm gut was removed 4 weeks following operation Only the scar of the laceration and a very small scar where the silkworm gut was brought

out at the gland exists In a follow up after 1 year the patient states that the gland and duct are functioning normally

CONCLUSION

1 A modification of Homans' method for re pair of traumatic fistulas of Stenson's duct is reported

z The bringing of the silkworm gut out through the gland is an important part of the technique

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THORACOPLASTY WITHIN THE SANATORIUM

PAUL D CRIMM, MD, FACS, DARWIN M SHORT, MD, and CLARENCE S BAKER, MD, Evansville, Indiana

UMEROUS institutions caring for the tuberculous sick are located a great distance from clinics and medical centers where thoracie surgery is performed. It therefore becomes desirable for certain of the sanatona to add the necessary surgical procedures to their armamentarium, if in the future they are to continue operation in the full interest of patients affected with diseases of the chest

It is advantageous to do surgery in the same institution because long periods of hedrest are required between minor collapse procedures, v hich are essential before major surgical collapse is instituted. The pre-operative and postoperative care can be followed intimately and more understandingly in the institution where tuberculous is treated and all facilities are available to meet the vicissitudes of the tuberculous patient. If the patient is moved to a general hospital his stay must be, of economic necessity, as brief as possible. The patient is ofttimes returned to the sanatorium where follow up supervision by the surgeon is unwilffully neclected.

In this series, 180 operations were performed on roo consecutive patients with pulmonary tuberculosis Ages ranged from 16 to 05 years. Fitty-six were women and 44 were men. The operative mortality was nil. There were no postoperative deaths earlier than 4 months. All patients were hospitalized in the sanatorium and thoracoplasty was the final operative procedure indicated. This was instituted in an endeavor to prevent them from heing permanent bed patients, or continuing throughout life as infectious hazards to their

families and communities

ANALYSIS OF CASES

Of the 100 cases, 24 were moderately advanced and 76 were far advanced cases of pulmonary tuberculosis. Sixty cases had cavities at least 3 centimeters in diameter, while 26 cases had smaller but generally multilocular cavities. In 14 cases, if cavitation was present, it was hidden by dense infiltration, frequently of long duration. Five cases had cavitation in the lower lobes. There were 2 cases with blatteral cavitation in the upper lobes. Seventy cases had infiltration in the contralateral lung ranging from a minimal lesion.

From Boehne Tuberculo is Hospital Exansville Indiana

to moderately advanced Eight had a few areas of calcification in the contralateral lung, which were of the primary type. The 22 cases remaining had no evidence of disease in the opposite lung, either by v-ray or physical examination. In 22 per cent of the tuberculous cases admitted to this hospital the patients were ultimately recommended for thoracoplasty.

Posture sputum prior to thoracoplasty was found in 94 per cent of the cases. To date 80 per cent of the 94 patients with positive sputum, who are now living, have a negative sputum, if per cent continue to have a positive sputum.

Nme per cent of the 100 cases are deceased over a 4 year period. Four of the nine deceased had a negative sputim prior to death. The various causes of death are as follows brain abscess, 1, chronic nephritis, 1, typhoid fee 1, 2, and 1 committed suicide following a postoperative psychosis. Of the 5 who had a positive sputimin prior to death, 3 died of tuberculous pneumonia in the opposite lung, 1 of tuberculous tracheobronchitis, and 1 of 5 self-destruction (Table I). Of the 91 patients living, 5 have no activity other than bathroom privileges, 27 have limited activity, and 59 are working (Fig. 1).

In this series there were 45 patients nbo had received pneumothorax pnor to thoracoplasty. The duration of the collapse in these cases is as follows 28 cases for 6 months or less, to cases, 6 months to 1 year, 3 cases, 3 years, and 1 case for 5 years of the total number of patients receiving pneumothorax, 53 per cent developed fluid and 9 per cent psopheumothorax. Except for one, none of these pneumothorax cases manifested a negative sputum following this form of therapy. In 1 case the pneumothorax was of 5 years' duration, which rendered the lung unable to re-expand and a thoracoplasty was indicated to obliterate the pneumothorax casyty.

Pneumothorax in the opposite lung is indicated in any early spread of disease, in spite of the fact that a spontaneous collapse may be a complication. The risk of spontaneous collapse is far less than that caused by an extension of the disease and ultimate death. In 5 of the cases reported pritents are now taking pneumothorax in the opposite side and of this number 4 have a negative sput multiple of the number of the presented in reasonable of the sput multiple of th

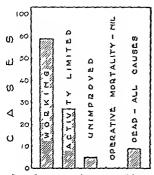


Fig 1 Po toperative secults in 100 cases of thoracoplatit (180 operations) over a 4 vest period

in opposite lung i vent in cases i vents in i case 4 months in 1 case 2 months after thoracoplasts Phrenic nerve operations were performed on 11 per cent of the cases Four patients had a phren icectom) 2 years prior to thoracoplasti acases 6 months prior a cases a year and a case a month In the authors opinion it is doubtful if any of these patients were benefited by the phrenaecc From the senior author's experience and results it is believed that phrenic nerve interniption is not necessary in the majority of patients with tuberculosis. If possible a partial pneumothorax is a much wiser preparation for thoracoplasts than phrenic nerve operation. Permanent interruption of the phrenic nerve duning he vital capacity which cannot be replaced when it is needed in the future management of the case

There were 3 cases of bilateral thoracophary performed after the method of Allen, and 2 of these had a subsequent paratim plombage on one side in preference to resecting further lower ribs and reducing the vital capacity. Paratim plombage, in our opinion has a very definite place in completing the closure of residual cavitation. By this method the pointer tan still have the advantage of a partial thoracoplasity with conservation of vital capacity. Adequate collapse with minimum mum reduction of vital capacity, should be the operator's prime consideration.

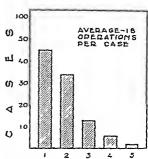


Fig. 1 Operations according to tages in 100 consecutive cases of thoracopla, to

Of the 150 operations, 153 were performed from the posterior approach and 27 anterior thoracoplasues and costectomies were performed before or after the posterior operation. The anterior operation is advantageous as a primary operation It gives the surgeon an insight as to the operative n.l of the patient. It oftimes reduces the production of sputum. It permits a greater number of tibe to be removed in toto at the second or posterior operation. Frequently it is necessary to wait eneral months before a second posterior opera tion is performed, whereas it is seldom necessary to want longer than 2 or , weeks after the antenor operation. In our experience many patients can withstand an anterior operation of four costal sec tions followed in 2 or , weeks by five po-terior sections much better than they can tolerate the entire first three ribs being removed during one operation. Forty five patients had a one stage operation at which time three to five ribs were re moved occasionally six but seldom seven. Thir ty four patients had two operations with removal at the second operation of three to five ribs but seldom six Thirteen patients had 3 operations 6 had 4, and 2 had 5 (Fig 2) Numerous stages were necessary because insufficient collapse resulted from the prior operations. In these cases either regenerated ribs were resected or else the patient had empyema which necessitated the removal of regenerated ribs and panetal pleura Only a small area of pleura and nh was resected

at one time, which in turn diminished the opera-

Pneumonic consolidation of the lower lobe (operated upon side) due to bronchiogenic spread following an upper stage operation was manifest in 3 cases After the disease in the lung operated upon was apparently arrested 5 patients developed active infection in the opposite lung Two of these had no previous evidence of inhitration Four responded to pneumothorax in the opposite lung and I died, due to delay in seeking medical advice One case had a marked shift of the mediastinum and extreme dyspnea and tachycardia, with stabilization in 4 days. The raising of tenacious sputum was a serious complication in 1 case which had a tuberculous tracheobronchitis. The absence of contralateral pneumonia in this series, in the writers' opinion, can be attributed to meticulous care as regards pre operative dramage, choice and administration of anesthetic, and the duration of the operation

In many cases a slight injury to the brachial plerus was manifested after the posterior upper stage This was evidenced by hyperesthesia or paresthesia along the medial surface of the arm, forearm and hand These symptoms disappeared, usually within a week, and without residual Five patients experienced pain because the tip of the scapula became impacted beneath the adjacent ribs This either disappeared or was remedied at subsequent resections. Two patients developed a mild wound infection. Delayed healing of the wound due to a septic necrosis of the skin on the axillary side was experienced in 15 cases Stitch abscesses occasionally occurred but were of no consequence. There was one acute genitourmary infection which rapidly subsided

A pleuroesophageal fisula with massive empenaexisted in case Subsequently this nas successfully closed following the second stage. Oue patient became critically ill with amebic dysentery: 2 days following operation. This was controlled with emetine therapy. Another patient developed a periodic tic of the daphragm the second day after operation, first stage, upper Respiration was atypical, resembling a Biot type. The administration of carbon diovide gave some rehef with total disappearance of the 5) mptoms in 18 hours.

A majority of the patients exhibited signs of mild shock, the systolic blood pressure dropping to 100 to 80 millimeters mercury, depending upon the anesthesia Cyclopropane causes a shightly greater fall of the systolic pressure than does nitrous ovide-oxygen. The use of cyclopropane is

a distinct advantage for the following reasons (1) better relavation with a wider margin of safety is possible, without increasing the respiratory embarrassment, (2) no restriction of ovygen is necessary to maintain a profound anesthesia as is the case with nitrous ovide-ovygen (3) a large percentage of ovygen with a small measured quantity of cyclopropane maintains good anesthesia, without marked changes in blood pressure during operation

In this series, 2 patients required blood transfusions after operation, although routinely 2,000 cubic centimeters of normal saline is given by hypodermoclysis immediately after every operation Circulatory and respiratory systems were critically checked and supported during the first 18 hours after operation A careful examination was made before operation of the vital capacity, the cardiac and renal functions Patients with a low vital capacity are relatively good risks, provided they are free from any my ocardial or renal damage Young patients whose vital capacity is hetween 900 and 1,000 cubic centimeters may be operated upon without grave risk. Older individuals, past 50 years of age, should have a vital capacity of at least 1,500 cubic centimeters if post operative complications are to be avoided

INDICATIONS AND CONTRA INDICATIONS

An early tuberculous pulmonary infiltration contra-indicates the employment of thoracoplas 13, except in a case in which hemorrhage cannot otherwise be controlled. Such an infiltration which has been subjected to approximately or months' bedrest, with or without supplementary pneumothorax, usually manifests sufficient filtrosis and resolution for a major collapse. The extent, character, and distribution of infiltration must finally decide the time of operation. A tuberculous process which has tended to heal with resolution, cavitation, and fibrosis over a period of 6 months to 2 years makes the patient a far better surecal risk.

In evaluating a candidate for thoracoplasty one cannot rely on any single criterion. The most reliable criteria are the stereoscopic x ray findings. For example, a patient may have essentially a normal hood sedimentation rate, a normal Arneth adex and Schilling count, and be obviously improved chinically, but the x-ray may show a very soft infiltration which should not be collapsed until further resolution and fibrosis is evident. In advanced disease in which thoracoplasty is inertiable it is advisable to prepare the patient for that procedure as early as the above stated criteria will permit.

TABLE 1—CAUSES OF DEATH AND POSTOPERA TIVE INTERVAL FOLLOWING THORACOPLASTS

Cause of Death	TEST STATE	Cases
Brain abscess	1 yr	r
Chronic nephratis	3 yrs	r
Suicide	4 mas	r
	z yz	1
Typhoid	3 yrs	1
Tuberculous tracheobronchitis	2 YTS	T.
Tuberculous pneumonia	2 yra	2
	3 yrs	1
Total		

As a rule, pneumothorax should be attempted as a therapeutic test prior to any plastic operation on the chest. The information as to the presence or absence of adhesions, offtimes crivitation, Beri bility of the mediastinum as well as the response of the opposite lung can be obtained by the introduction of air into the pleural space. Thoracoplasty performed over a lung which can be collapsed with air may end disastrously with a mediastinal flutter Thoracoplasty, therefore, is not a substitute for other collapse procedures. The use of pneumotherax, if only partially successful, hastens re-olution and the development of fibro sis Development of fluid aids in fixing the mediastinum and adhesions formed after decompress on diminish the collapse of the normal lung tissue which is proximal to the inhitrated area Partial pneumothorax together with partial thoracoplasty on the same side in the anters' experience, is not a successful procedure, but may be used to temporize a bronchiogenic spread

An upper partial thoracoplasty followed by a pleuml plombyen in the same side, it necessary, is preferable and more conservative than an upper stage thoracoplasty and phrenic netwo operation. Pleural plombage used in this manner conserves a patient's vital capacity. The operation is indicated as soon as idhesions develop following a thoracoplasty.

Conservation of vital capacity, commensurate with adequate closure of the militrated area, as essential in any case of tuberculosis. Tuberculosis is a diseale which progresses in a series of area denis and the successful management depends on anticipating these accidents. The conservation of as much normal lung tissue as possible for any subsequent spread of infection is paramount in selecting operative procedures. For example, a phrenicctionly might assist a patient in healing a minimal apacial lesion. Several years later if decase develops in the opposite lung the patient may require a pneumothorax or later a thoraco-plasty, or even a bilateral thoraco-plasty. The previous phrenic nerve operation has diminished the

vital capacity which now is gravely needed. In reviewing such a case one wonders if the earlier phrenicectomy was either imperative or a wise procedure In view of such possibilities the authors are apposed to permanent interruption of the phrenic herre unless unilateral disease demands a com Diete collapse The longer one can keep both dia phragms intact the more surgical procedures the patient is able to withstand later on Graham states that pneumothorax is a more valuable protedure than phrenicectomy and is in the habit of attempting pneumothorax in every instance be fore undertaking phremicectomy Certainly a phrenic nerve operation should not be substituted for pneumotherax, or performed prior to pneumothorax, if the patient is to be treated conserva tively However, a permanent interruption of the phrenic nerve may be indicated in decompressing a pneumothorax and in protecting closed cavities of the re expanded lung It also aids in re adjusting the mediastinum in a patient with marked con traction to the side operated upon or it may as ust in eliminating pockets of empyema. In this series the procedure of Alexander has not been used He recommends primary radical phrenicotomy and secondary resection of the upper seven ribs in order to reduce aspiration pneumonia Generally speaking, the authors helieve that far too many phrenics are interrupted without due

consideration of the ultimate procedures. In a number of cases thorscoplasty was admittedly used, not to effect a cure, but in an endear or to improve the status of the hopeless case, by reducing sputtum and toric symptomatology. A case of long standing frequently gives an excellent result as far as the collapse of tuberculous infiltration is concerned, yet a concealed lesson in the Judney, intestine, or opposite lung may become activated in the future. The life of these patients is often prolonged, yet the results never add to the statis tead success of thorscoplasty.

In collapse therapy there is too much over emphases of single procedures which may be used in effecting the cure of tuberculosis. This over emphases may be proportionate to the availability of the different procedures. If such is true the pattent is allowed to pass the opportune stage for a certain collapse procedure just as he passes inside only from a minimal to a far advanced stage of the disease. Too often the recommendation of a procedure his thoracoplasty comes to the patient as a list recort rather than an early aid toward a

5UMMARY

In this series, 180 thoracoplastics were per formed in the sanatorium on 100 consecutive pa tients with pulmonary tuberculosis There was no operative mortality

2 Of the 100 patients, 24 were moderately advanced and 76 were far advanced cases of tuberculosis Over a 4 year period 9 cases are deceased, 5 have no activity, 27 have limited activity, and 50 are working

3 Pneumothorax is advocated as a prerequisite in preparing many patients for thoracoplasty

4 Thoracoplasty with pneumothorax in the contralateral lung, when indicated, either before or after operation, is a safe procedure

5 If preliminary phrenicectomy is indicated prior to thoracoplasty, only temporary phrenic nerve interruptions are recommended

6 Pleural plombage used as a subsequent procedure to thoracoplasty diminishes residual cavitation and precludes further rib resection

7 Anterior thoracoplasty and costectomy prior to posterior thoracoplasty reduces surgical risk and lessens the interval of time between operative stages

8 It is advisable to be somewhat more radical in selecting the time for performing thoracoplasty, and in turn become more conservative in safeguarding the patient's vital capacity for future breakdowns

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RESTORATION OF THE ENTIRE SKIN OF THE PENIS

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HERE are apparently only infrequent instances of loss of the skin of the pens, but the defect is a very acute problem to the patient and the repair may present difficulties in the selection and application of

suitable skin covering

In three of the four instances recorded here, free thick spit sain grifts have given permanent healing with complete normal sensation and function. In the fourth patient split grafts were used to supplement scrotal flaps and to repair the defect on the scrotum. Free full thickness grafts would give just as good results as the thick split graft, but in this area as in other parts of the body, the possibility of a full take in a contaminated field is much greater with the thick split graft than with the full thickness graft.

Pedicle flaps from the scrotum may be used to over partial surface defects, and also where there has been damage to the cavernoum with deep scarring and contracture, so that a thicker restoration is desired than that which a free skin graft would give (Fig. 5) But the available scrotal tissue is not usually great enough for total resurfacing and, during the period of stachment of the flap there may be too much retraction of the pens and flap, with a resultant bulls, thick surface covering. This same fault may be found with pedicle flaps from other areas, and there will, all most undoubtedly be obtained a less normal apnearance and sensitivity than the free graft enes-

The two patients whose complete restorations with thick split grafts are shown in Figures 1 and 2 had suffered complete loss of the skin of the penis following circumcision. Because it was thought best to do as little suggestive recording as possible of the unfortunate situation, preliminary photographs were not taken hit, on examination of hoth patients when first seen the penis was found to be pulled up to the abdomen in a curled knot. Excessive cellulities and sloughing were present and the patients were in extreme discomfort physically and mentally. The covering of the glains was intact in both but there was no skin left in either except about 1 or 2 square centimeters on the ventral surface of one

Pre operative preparation of ulcerated cases. It was determined immediately to use free thick

split skin grafts and the main preparation was a saline bath in which the patient remained 3 to 6 hours a day, the same procedure heing used as has been described for humed patients (i 2) It is possible that this treatment was even hiesaxing for, when first seen there was no conjecture as to how bad the infection might become. This simple procedure plus the daily use of soap and water and painting the raw surface with mild antiseptics was the complete preparation up to the time of operation.

Operation: The surface granulation and deep scar tissue is carefully discreted away in lavers until the penis can be completely elongated, extreme care being used not to enter either corpora cavernosum or urethra. This procedure should be most painstaing, as complete relaxation of the scar and the necessity of obtaining a suitable surface for the errift are of first importance.

The next most important step is to obtain a free thick split skin graft of about one balf to three fourths the thickness of the skin of the thigh, in one piece large enough to cover the pens completely without the necessity of patch

ing any place (Fig 3)

A catheter is inserted and one assistant bolds the penis completely extended on the catheter. The graft is wrapped carefully and smoothly around the penis the edges heing overlapped to assure complete coverage. It is then sewed as curately in place all around the penis, at the corona and at the abdomen, and then down the line of overlap of the edges, with fine horsehar on fine needles. Further sutures are put through the surface of the graft with very shallow catches in the penis so that it is firmly anchored and mat tressed in place. Multiple stab holes are put through the graft and all blood is expressed.

Fine mesh gauze is wrapped smoothly around the extended penis, and then a gauze flat is wrapped securely on with a sterile bandage 60 that the penis sheld in complete extension on the catheter. An irrigation tube is placed alongside the penis, most gauze sponges are carefully built up from all sides around the penis, and a manue sponge pressure dressing is apphied by means of a double spica of gauze rolls. The whole dressing is firmly lixed to prevent an slipping or twining.

The suppress in both of these patients was due in a large part to the work of D \orange transition if it, assistant readent surgeon at Earnes Hospital

From the Department of Surgery Wa hington University School of Medicine



Fig. r. Complete restoration of skin of penis with free thick split skin grafts in one operation. Sensation and function normal. Shows also donor site on leg



Fig 2 Complete restoration of skin of pents with free thick split skin graft in one operation. Sensation and function normal. A small amount of redundant skin was removed at a second operation.

The tip of the glans is left exposed to be sure of circulation, and the extended penis is now in somewhat of a cast with the catheter left in place at right angle to the abdomen

If it is thought that a wet dressing is not necessary, the first gauze against the graft can be of 5 per cent xeroform, or some other ointment, and the irrigation omitted After-care The dressing is kept moist with saline, added through the irrigation tube, and is carefully taken off after 4 or 5 days. All sutures are removed, dead edges are trimmed away, and any blisters or infected areas are opened. Silver nitrate, I per cent, or some mild mercurial antiseptic, may be used locally and a firm grease gauze dressing carefully reapplied in an attempt to keep



Fig 3 Photomicrographs of thick split skin grafts which were used in patients in Figures 1 and 2. The grafts are about two thirds of the full thickness of the skin.

the penis still extended for a few days. If there is much cellulitis present a wet dressing should be maintained.

Later, if sebaceous collections occur in the graft, they should be empted out by pressure or through slight incisions. If too much contracture either circumferentially or longitudinally should occur, more skin could be put in by simple in cision of the graft, the edges being, expanded and the defect filled with a scrotal flap or free skin graft.



Fig. 4. Healed granuloms inguinale with penis completely buried in scrotum but intact except for complete loss of skin. Restoration of skin covering with scrotal flaps and supplemental thick split skin grafts for the base of the penis and the scrotum.

SUMMARIES OF CASES

The patient shown in Figure 4 was seen after an extensive granuloma inguinale had healed, with the penis completely burred in the scrotum Urine came through 7 small fistulas, and, accord ing to the patient's observation of the ulcerative and healing process, it seemed certain that the penis was actually present, and added to this, was the patient's assurance that normal erections occurred. At operation a penis of very large size was found in its scrotal bed with no sign of any skin covering whatever, but with the covering of the glains intact. The penis was brought out of the scrotum, and there was left attached a large scrotal flap that was varioped around and united



Fig. 5 Shows use of scrotal flap for partial restoration The pents has been dissected free from a contracture into the right inguinal rigion and the flap has been rotated up from the scrotum to fill the defect. The original lesson was a guishot wound.

on the ventral surface. At a second operation, two more literal scrotal flaps were rotated into the base of the penis after it was freed. This left the penis out of the scrotum but shortened and pulled in close to the abdomen with the scrotum elevated. Then, at a third operation, the whole contracted area was opened so that the penis could be completely extended, and the resultant raw area was covered with a thick split shin graft. It by 22 centimeters. The patient left the hospital in excellent condition and apparently satisfied but would never return for examination or photograph.

Another patient! was seen with active ulcers of granuloma inguinale, which had failed to heal under medical and v-ray treatment. The ulcers were destroyed with the crutery over wide areas, and, after granulations had formed, the repair was done with free thick split grafts. Two stages were necessary because large areas had to be grafted in the inguinal regions and because one of the ulcers was so close to the urethra that it was

'This patient was taken care of by Dr George K Lewis

not grafted at the first stage. This patient finally became entirely healed but subsequently presented the same disease about the lips (3)

CONCLUSION

When the slan of the penis has been lost, it is thought that free thick split grafts may suffice in most instances for a suitable repair, and they might be used to effect early healing in ulcerated cases, even if a thicker pedicle flap repair might have to be done at a later date

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SPINDLE CELL BLADDER SARCOMA

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ROBABLY oo to 95 per cent of tumors of the unnary bladder are of epithelasl organ Primary sarcoma of the bladder, estimated to comprise about 4 to 5 per cent of the malagnant tumors of this viscus is of great interest on account of its comparative ranty second any metastatic sarcoma is extremely rare and less than ro such cases have been reported in the therature But the rarest and most interesting tumors of the bladder are those of mixed structure which show histologically cells of both epithelial and connective tissue origin. Only a very few of such tumors of the bladder have been reported in medical statustics. The following case of this twee has been recently observed.

CASE REPORT

Patient S. C. ago 35-years married was referred to the Alexan Brothers Hospital Chicago section of surlogy. November 7 rog5 He gave a history of trauma resulting from a fall 5 months prior to his netrance in the hospital He claimed to have fallen from a truck, distance of a boost the foregoing he complained of right result pain and transient hematism. A loss in weight of so pounds was reported during the past 5 months and the following unnary symptoms in increasing proportions inactive facilities of the pounds was considered to the control of the control

The patient was subly cachectic anemic and presented a greatly distended bladder. Cystoscopic attempts resulted in failure due to excessive hemorrhage clots and sillus his tumor processes which were in abundance in the bladder washings. Exectory pelography presented a complete absence of right renal or ureteral shadows whereas the left kidney and ureter were within normal limit.

Supraphile Cytotomy, was performed at large fraudiems of tumor tower was found to full the bladder completely. The mass was gray pink, in hue necroite and hierding profutely. The base was broad firm and not minkle cambing in consistency. The couldiouser like necroite cartilagenous base was thoroughly infegrated mediant, a wide area of apparent normal bladder mucosa. The base of the tumor was approximately 5 centimeters in diameter of the tumor was approximately 5 centimeters in diameter pletely occluded. The nevitable suprapulsic fistults was established pattent submitted to routine straids atom.

On January 11 1937 about 2 months following his criticate in the hospital a large area of necrotic hemoritagic tumor tissue appeared at the suprapulue opening and or examination the bladder has again partially filled with recorrence of the tumor which was thoroughly removed rapidly losing ground and a first letrimination is expected by metastases exhaustion or embolism. Misrateophe report "Section 1 Imbedded with loose Misrate and Partial Par

Microscopic report Section 1 Imbedded with loose fibrillar and moderately vascular connective tissue there are fastly well corcumserated islands of long spindle shaped cells which arrange themselves in the form of intertoing bandles. The nuclei of these cells are oval moderately into inchromatin and mitotic figures are frequently found. In the center of some of these islands one finds groups of ir regularly shaped cells with ample clear cytoplasm. There are single eslands in which the latter variety of pleomorphic cells predominate and in which there is a more marked variety in size shape and structures of the nuclei (Figs. 1 and 2).

Section a consists of a very vascular hemorrhage and partially necrobe tissue which encloses islands of large polygonal cells with distinct outlines and oval nuclei rich in chromatin. There is a moderate number of mitories with irregular short and plamp chromosomes (Figs. 3 and 4). Other sections revealed a diffuse overgrowth of phomorphic cells. In places the cells (ormed oords and were

Other sections revealed a diffuse overgrowth of pleomorphic cells in places the cells formed cords and were polygonal or elongated with ill defined cell outlines. In other places the cells were elongated to spindle shape and separated by thin strands of a finely fibrillar tissue. In other areas motion figures were numerous.

Diagnosis Transitional cell sarcoma with sarcoma like areas The first section suggests a diagnosis of spindle cell sarcoma while the second section shows a squamous cell carcinoma. In another section transition between the sue extremes is found and it can be clearly seen that by becoming clongated and artanging themselves in fascicles the carcinoma cells assume a sarcomatious appearance

Sarcoma of the unnary bladder is indeed a rise entity. The first case histologically venifed as a spindle cell sarcoma is ascribed to Sentitleben in 1807. Gabe states that Guersant reported a case in 1853. unfortunately, no mention is made of histological proof. Wilder in 1905 searched the literature and reported to cases of sarcoma of the bladder with reasonable histological verification of the diagnosis. Of these, 2r cases were of large or small round cell type and 5 cases were mixed cell type (spindle and round cells).

Scholl in 1922 found only 1 sarcoma in 262 bladder tumors seen at May 0 Clinic Munwes in 1910 collected 107 cases in the literature and reported a personal case. In 1929 McCarthy and associates increased the total to 128 cases and since then one or two isolated cases have appeared in medical publications each year, so that less than 1900 cases have been recorded to date

All histological types have been reported-spindle cell round cell mated cell, a he olar angiosarcoma, fibrofusocellular, my osarcoma and myxosarcoma tymphosarcoma, and estevedrondrosarcoma Dr Jaffe in his report of the pathological sections stated that these tumors are always questionable, difficult of differentiation, and have been recently noted in through malemancies

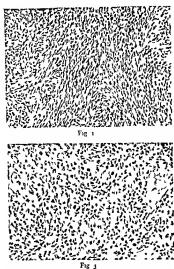


Fig 1 Spindle cell sarcoma like section an example of tissue in which imbedded with loose nbrillary and mod erately vascular connective tissue, there are fairly well circumscribed islands of long spindle shaped cells which arrange themselves in the form of interfacing bundles.

The question of the possibility of the occurrence of epithelioid sarcomatous tumors has passed beyond the stage of speculation, they are observed in the uterus, breast, testis, thy roid, and in certain other glandular structures, also other regions of the body where both types of tissue cells may be present, either as part of normal structures or as embryonal rest cells In the unnary bladder, such a mixed cell tumor is obviously unusual. The preliminary pathological section made in the case before us was clearly a spindle cell sarcoma and as such was diagnosed by one of our most distinguished pathologists. However, after further pathological study and serial section analysis, the fact was firmly established that we were dealing with a questionable type which resulted in a diagnosis of spindle cell epidermoid sarcoma

In the literature cases of epithelioid sarcoma of the urinary bladder have been reported by Kraft.



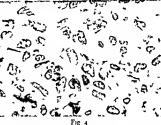


Fig 2 High power of Figure 1
Fig 3 A second section illustrating the transitional cell
carcinoma. Large polygonal cells with distinct outlines
and oval neucleinch in chromatin are evident

Fig 4 High power of Figure 3

Krompecher, Lenormant, Borst, Parmenter, and Gabe

Gussenhauer and Billroth reported my osarcocarcinoma and Albarran an adenosarcoma. In the 2 cases the tumors were probably derived from allantoid remnants at the bladder dome. Kraft's case was in a man 78 years of age. A small tumor was removed from the bladder wall by the intrapentioneal route, rapid recurrence followed which resulted in a mass the size of a fetal head. Upon histological examination the presence of epithelial and sarcomatous elements was demonstrated

Lenormant reported an epithelioid sarcoma of the bladder probably of allantoic origin Histologically it showed in parts a sarcoma with fusion cells and in other areas epitheliolated or alveolar tubules with cylindrical cells The tumor was found in a woman 58 years of age and weighed 570 grams In commenting upon Krompecher's case and his own, Borst postulated the following

- 1 That a sarcoma and carcinoma may arise independently in the same area and ultimately
- 2 That the mixed tumor begins as a car cinomatous epithelial growth and the stroma at the same time becomes sarcomatous
- 5. That a carcinoma develops in which the stroma gradually becomes sarcomatous
- 4 That rarely the tumor is at first a sarcoma and later the overlying epithelial structures be come carcinomatous

Parmenter's patient was a 64 year old female In this case various microscopic sections of the bladder tumor showed large spindle cells and irregular masses of stratified squamous epithelium with cell rests In Gabe's case the pathological report stated that the tumor mass suggested a polymorphous cell sarcoma Parts consisted of trabeculæ of spindle cells and other parts con tained solid trabeculæ of polygonal carcinoma cells however, the growth could be accepted as a mixed carcinoma and sarcoma From the available evidence it was difficult to decide whether the tumor was primarily a carcinoma undergoing sarcomatous degeneration, whether a carcinoma and sarcoma had arisen simultane ously or whether the growth was carcinoma undergoing a typical degeneration the spindle cells and the giant cells being the expression of a defense reaction to the carcinoma cells. The ir regularity of the nucles of the spandle cells, the presence of mitoses, and the absence of well formed blood vessels were in favor of a malignant grow th

McCarthy calls our attention to the fact that in a sarcoma of the bladder extending submucosally, a reaction probletation of the over tigning epithelium may sugment ultimate ulceration. In one of their cases the microscopic section from the periphers of the bladder wall tossue adjacent to the tumor, pre-entied at the edgest transitional epithelium toward the center, the surfaces became denuded of epithelium and the underlying stroma was formed by an arrangement of spindle cells with long synulde shaped nucles.

PATHOGENESIS

The question now arises as to the pathogenesis of these mystifying tumors

Eving cites Borst and others to the effect that sarcoma does not develop from previously normal cells, but from embryonal cell groups. He considered that the association of carcinoma with sarcoma is teratological in origin. In several cases

that he has noted, he was not satisfied that the spindle cell areas were not modified epithelium This would be in accordance with Caulk's views, who states that there is a great selectivity of sar comatous tumors of the bladder for the trigone and at its juncture base, which in all probability has a great deal to do with the faulty seam of fusion of the two fetal surfaces and the mesodermal origin of the trigone which is derived from the lower end of the wolffian duct, the remainder of the bladder being derived from the ectodermal cloaca In our opinion, however, it may be possible and quite logical that aberrant mesodermal embry onal cells may be located anywhere in the bladder wall, just as aberrant embryonal cells are found in various locations of the body

For the foregoing reasons, if we may centure an opinion on pathogenesis, we presonally prefer the fourth postulate of Borst, namely, that in a case of supposed epitheliomal sarcoma of the bladder for example, the tumor is originally a sarcoma with the overlying epithelium under come cannomatous change.

TREATMENT

The rationale of tumor management has tradi tionally been a perplexing problem confronting urological surgeons, and although there has been much divergence of opinion in the past, yet a review of the literature will impress one with the modern unanimity of thought and reaction on this subject. We must ever be mindful of the value of prompt diagnosis and early attack on bladder malignancies Also the gradation, as learned from biopsi reports, will materially assist one in selecting the form of therapy to use in a given case Roentgen ray, fulguration radium and total cystectomy are our most potent weapons in the treatment of bladder tumor Cutaneous ureterostomy, intestinal ureterostomy, and resections of the bladder vault or lateral walls have been discontinued in our service, and, in many instances, patients are made infinitely more comfortable and life has thereby been prolonged Cutaneous ureterostomy in conjunction with fulguration and radium has been of inestimable value in selected cases

The literature states that in 69 patients oper ated upon, only 3 patients were considered cured, having been followed for a period of from 3 to 12 years

Laberal resection of the tumor bearing bladder wall or complete existectomy and ureteral trans plantation may result in cure in an early diagnosed case. However only about 8 such cases have been recorded in medical literature.

SUMMARY

In the foregoing case report, literary review, and pathological comments on the subject of spindle cell sarcoma, we are confronted with the question as to whether all the reported cases of spindle cell bladder tumor were true to type, also is it not logical to assume in the light of modern pathological investigation and the splendid work of The American Urological Society Tumor Registry that certain cases reported in the past might have been transitional?

Bladder tumors, not unlike malignancies in other bodily structures, continue to present an open challenge to surgeons and prithologists. The histogenesis, pathogenesis, and embry ological uncertainties are gridually assuming more

stable and dependable positions

The epic making work of cancer surveys, cancer clunes, and pathological investigations are rapidly clarifying these perplexing problems, and we feel that in the not too distant future, tumor management will be greatly simplified

The authors wish to express their due appreciation to Dr Richard Jaffe Dr L Hektoen Dr J P Simonds, and Dr B H Neuman for their interest enthusiasm and courteous assistance

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CARCINOMA OF THE BREAST

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O speculate concerning the unknown is usually an entertaining but profitless pastime However, if one studies the conditions that seem to precede the de velopment of a disease of unknown origin, there is always the possibility that some knowledge might be obtained which might prove to be of prophylactic value. With this thought in mind we have reviewed the histories of \$18 cases of carcinoma of the breast. This series of cases extends over a 25 year period. These histories were all taken by internes and many are incomplete but in none of them was there any attempt made to 'fit the history" to any theory of etiology Apart from everything else, we do not champion any theory as to the causation of carcinoma of the breast. However, this review is simply a statement concerning certain conditions of the breast which were found to exist before the diagnosis of carcinoma of the breast was made. Whether the correction of these conditions will prove of prophylactic value, time alone will determine, but, certainly the measures advocated to correct or prevent such a set of symptoms will at least be of benefit to the patient whether they have any value in preventing the development of carcinoma

Some form of 'dysfunction' of the breast was found in 83 per cent of these 518 histories. This statement demands a fuller explanation of the expression of 'dysfunction. For example (a) in 48 per cent the normal breast function was never established (b) in 38 per cent there was a distinct irregularity of lactation (c) in 10 per cent their were histories of twocesses definite and repeated trauma or infected nipples. (d) in 12 per cent nothing abnormal was found in the histories.

In studying groups a b, and c it might be in teresting to review briefly some of the comparatively recent research work done concerning etiology of carcinomy of the breast. It might also be profitable to analyce as far as possible, what occurs in the breasts of the lower animals when subjected to certain hazards which are forced on women by the so called higher cavilization.

Many attempts have been made to isolate some specific bacterial organism which might cause cancer. The consensus at the present time is that

Presented before the Pan Pacific Surgical Association Hono ulu Hawan August 6 to 14 1936 cancer is not caused by any specific micro-organ ism

Herring has recently published statistics to show that the incidence of carcinoma of the breast is 747 per hundred thousand in single women over 35 years of age, while with married women over 35 years of age, such an incidence is 410 per hundred thousand of population In other words, the ratio of incidence in this age group is nearly twice as high in single women as it is in married women. In the ages below 35 years, cancer of the breast occurs so infrequently in both the single and married groups as to produce rates too low for accurate comparison. This bare fact is especially interesting at this time when so much is being published concerning the association of breast conditions and the organs of internal secretion

Time does not permit me to discuss the various fascinating pieces of re-earch work that have been done

In the 246 cases in which lactation was never established, pain was found associated in the breasts a few days before each menstruation in 193, or 18 per cent. Of those 193 cases, 174 states more definitely smollen on the side in which the carenoma their developed. However, this in formation cannot be accurately estimated, for the pattent naturally assumes the pain was more marked on the side in which the growth later de veloped.

The chemical theory of etiology of carcinoma began with the experimental work of Yamagiwa who was able to produce cancer of the ears of rab bits by repeated application of ordinary coal tar

Block and Dreypuss found that, by distilling coal tar at very high temperature, they obtained a product which produced cancer in mice in a shorter period, and in a higher percentage of cases than did ordinary coal tar

Kemeway isofated dibenzanthracene from cord tar and found such to be the carcinogene agent He further proved that, when this chemical was removed from coal tar, the coal tar did not produce cancer in mice no matter how frequently and how long it was applied He also succeeded in producing dibenzanthracene synthetically and such was also highly carcinogene in mice

Recently Lacussage has produced cancer in

male mice by the injection of estrm. This requires many injections, over long periods of time. The most frequent site of the cancer in these mice is in the breast.

Even more recently assays of breast tumors have been made, and such seem to indicate the evistence of a carcinogenic hormone. These experimental indications combined with the clinical observations seem to indicate that the ovaries contain some carcinogenic control of breast tumors.

While neither the experimental results nor the clinical associations are sufficiently definite to be certain of dependence of the formation of bresst tumors on ovarian dysfunction, still these studies emphasize the importance of the proper correction of pelvic disorders with the view of preventages.

ing tumor formations in the breast

Max Cutler advocated the giving of ovarian residue (without corpus luteum) in these cases with painful breast, and with \(^1\) (ew of our cases, we thought the patients obtained some relief from such medication. At the present time, we rather agree with Emil Novak in not having any faith in the oral administration of glandular extracts. Also our experience with the subcutaneous injections of estrogenic substance as advocated by Whitehouse has not been such as to inspire much confidence.

While much valuable research has been done in the physiology, puthology, and chemistry of the organs of internal secretion, and especially recently concerning the interdependence of the various glands on each other, still at the present time we do not seem to have any definite therapy to relieve these breasts which are painful during and preceding menstruation, and which might be the

forerunners of the future cancer

However, we have found that the pann in many of these cases is relieved by the use of a properly fitting brassier. This pain is frequently most pronounced in the upper outer quadrant of the breast A 'pocket' brassiere with a piece of elastic about 4 to 6 inches long in the strap support, with the straps crossed behind the shoulders and with an adjuster in front where it is accessible, prevents the drag of the breast. Experience has taught us that different types of brassiers will be needed to elevate and support different types of breasts, the essential factor being that the breasts are not pulled to the chest wall as is now usually done

As cancer of the breast is also found most frequently in the upper outer quadrant, it makes one give more serious consideration to the lymphatic obstructive theory of Handley as being a possible eurological factor. In this connection, it is interesting to recall the fact that malignancy of the

udder of the milk con is practically unknown With the dairy cow, lactation is almost continuous, and the dependent position of the teats allows free and complete drainage. Drabble made a very extensive study of the udders of all cows slaughtered in the State abittor at Homebush Bay, New South Wales, Australia, from 1926 to 1929. He does not state how many animals were called during that period, but he was able to find only 3 cases of malignancy of the udder and all 3 of these were epitheliomas and did not involve the milk ducts.

Feldman, in his book entitled Neoplasms of Domesticated Animols, states he has never seen a cise

of carcinoma of the udder of a milk cow

Cancer of the breast of bitches is very frequent and is perhaps due to the fact that the puppies are removed from the breast very early, probably before the mother finishes the lactation period

Bagg was able to produce 87 per cent of mammary carcinoma in mice by removing the young from their mothers soon after birth. The incidence of mammary carcinoma in the control group

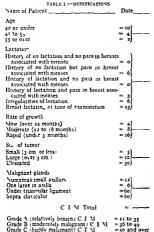
was less than 5 per cent

Cancer of the breast in Japanese women living in Hawaii, who have a large number of children, is very rare. The same condition of affairs exists in the miners' wives in West Virginia. This may be due to the fact that these women have the idea that while nursing a baby there is little danger of pregnancy, and that they continue lactation as a defensive measure.

All these factors would seem to indicate that those conditions which do produce obstruction or irritation (lymphatic or any other type) might produce cancer, especially in those patients with "constitutional tendency" to malignancy What biologists mean by the term "constitutional tendency" is necessarily somewhat indefinite. However, there is no doubt that there is a definite association between heredity and cancer ticles by Little and others working with high and low cancer strains of mice definitely demonstrate such an association with animals, while the study of Clara J Lynch with twins and cancer in the human race proves without a doubt that heredity does play a very definite role in the causation of cancer in the human being. The following is a very clear statement quoted from a small portion of her article

Of special interest for this discussion is the testimony from duplicate train. If two individuals are derived from the splitting of one fertilized egg and therefore composed of the same germ plasm, they should not only resemble each other to a marked degree in physical appearance, but should also exhibit the same susceptibility to disease, if it is true that susceptibility is an inherited character. In

Nf D



C I M Clinical index of malignancy

recent tensers of the literature 36 cases have been distursed. In it cases only it member of the part had a tumor. But as the unaffected individual in all but one instance was still lung when list investigated the final report for the group cannot be given. Since some variation is to be expected the occurrence of a limited unabler of exsistence of the contract of a limited unabler of exafforded by the 26 remaining pairs. All had tumors the growths of each couple were in general of the same type in the same organ and appeared at approximately the same time. The fact that when both thouse do have tumors they present such compressed in the contract of the they present such compressed in the contract of the contract in favor of genetic contract.

While the work done on the association of heredity and cancer is most interesting, still I am quite sure we will not be able to establish any prophi lactic measures until we give ass much thought to the matting of human beings as cattlemen do to the breeding of their animals. Certainly were we able properly to mate human beings in a bro-

logical sense, such as Maud Slye has done with mice, we have every reason to believe we could "breed out" carcinoma of the breast in the buman

We have all had experiences with cancer of the breast in pregnancy, and doubtless recall how very "mild" the malignancy developed In 1922 I was able to collect (12), as a result of a questionnaire only 15 instances in which pregnancing the state of the cocurred after remotal of a breast for carcinoma. Of this number, 13, practically 87 per cent, developed carcinoma in the remaining breast, 12 of whom died very promptly. The interval period between operation and recurrences associated with pregnancy varied from 2 to 10 vers.

If these observations are accurate the following practical suggestions might prevent the development of precancerous conditions of the breasts

ment of precancerous conditions of the breasts.

More careful bistory taking with an accurate analysis of the history. Deductions made from these histories will often also aid in determining whether to treat the case as beingn or whether to handle it as a possible precancerous lesson.

2 Education of mothers as to the necessity of nursing their babies for at least 6 months or until the breast has been relieved of all products of

lactation and stagnation
3 If for any real reason the mothers are not able to nurse their babies, insistence on the use

able to nurse their babies, insistence on the use of a breast pump (preferably an electrical one) until the breasts have been drained of all signs of retention of any of the products of lactation

4 More careful attention to the care of the nipples

5 Correction of pelvic disorders especially when there is any pain in either breast during the menstrual periods

6 More consideration to the proper support of the breast at all times

7 Instruction of young mothers not to become pregnant again after having had an operation for cancer of the breast

In vasting various hospitals I have been much impressed with the difference in the attitude of the pathologists and the surgeons as regards the prognostic value of the histological study of lissue Many pathologists apparently feel that there are too many uncertain and uncontrollable factors entering into such a study to give as much weight to its prognostic worth as do most surgeon. Some of these factors are

The individual equation of the various pathologists in differentiating cells. This was demonstrated by Bloodgood who sent the same set of slides to a number of well known pathologists and received in reply many different estimates of the same tissue

2 The site from which the specimen is removed, for certainly the histological picture changes the farther from the active cancer the specimen has been taken

3 The uncertain response of cancer cells to irradiation. Frequently it looks as if the more active and immature cancer cells regress more quickly than do the more stable and mature cancer cells when exposed to proper irradiation.

In 1938 Lee and Stubenbord pubbshed a chincil index of malignancy for carcinoma of the breast, and since this time we have been using a modification of it and found it of great value. Lee and Stubenbord followed for 5 years 100 cases of carcinoma of the breast which had been classified by their clinical index, and Ewing made groups of grades based on the histological index of the same 100 cases. The chinical grading was found to be more reliable than grading by the microscope However, we continue to employ the histological 'grading' of pathological specimens and feel both methods should be used jointly. In Table I are sbown the modifications

Carcinoma of the breast does not differ from any other disease in the fact that every case should be studed as an individual case and be given the benefit of such an analysis. However, there are certain general principles around which all treatment revolves. To be more specific, we feel that surgery, with the addition of intelligently given irradiation, is the basis of the proper treatment of carcinoma of the breast.

Routine v-ray examinations of the chest, pelvis, and long bones are made in all cases of carrinoma of the breast. During the last roo cases we bave found metastases in 2 cases in which there was no pain and nothing else to suggest the evistence of such a condition. There were 3 other additional cases in this same series of roo cases in which pain (usually thought to be "rheumanic") indicated that metastases might be found on v-ray examination, and such were demonstrated to be treeseat

Pre operative irradiation is probably the most important contribution of radiologists to the treatment of cancer of the breast and is now generally regarded as being of even more importance than postoperative treatment

There is one great danger in giving pre-operative irradiation that is not usually mentioned when the treatment of cancer of the breast is considered. With many of these cases, there is so much improvement in 4 to 6 weeks after exposure to the v-ray that the patients do not come back to the hospital for the necessary surgery until growth has begun to increase again. This sit tion is somewhat comparable to that exis in the case of hyperthyroidism and the preparent tion with iodine of the patient for a safer pai thyroidectomy For some reason, we do not s to be able to exercise this proper control of many of our patients As a result of this, we to make an accurate estimate of the patie mental ability and willingness to co-operate there is any question in our minds that the tient is mentally unable or unwilling for any of reason to carry out directions intelligently, t we advise immediate operation without operative irradiation. The present tendence toward the more frequent employment of ex sive pre-operative irradiation by the Coumethod with a high voltage machine

Occasionally, in very bad surgical risks in tremely old patients, we do only an amputa of the breast and give both pre operative postoperative irradiation. However, such a p

tice is very rarely justifiable

We feel very strongly that a radical remove the entire breast, the muscles, axillary conte etc. should be done in one dissection, from periphery toward the center, in other word complete Halsted type of operation We emp an extra fine silk for the ties, and with such l tures only very small amounts of tissue, if besides the actual vessel wall, are tied. We w out the entire operative field with hot salir hot enough for the hand to stand the heat, not so hot as to burn the skin This not washes out any clots of blood that might present, but, it is possible that the hot water i kill any immature cancer cells which may I escaped into the field of operation. The heat bas some hemostatic value as far as the extren minute vessels are concerned, sometimes t vessels are the cruse of postoperative collect of serum

The skin incisions are made wide of the gro and no thought is given to the closure of wound at the time of making these incisions has been suggested that the surgeon who me the incision for removal of a cancer of the br should not be the one to close the field of op tion, then he does not have the temptation to a little closer to the malignancy in order to m closure of the operative field easer

Thiersch grafts taken from the thigh are es

obtained and usually successful

A small stab incision is made in the a
avillary line Through the opening is place

light weight rubber drain. The drain is placed between the axillary vessels and the radium. In addition to the radium which is placed in the avilla, another 50 milligrams of radium are distributed in the area supplied by the internal mammary vessels and lymphatics Four 121/2 milligram radium needles are placed in a rubber tube which is about 12 to 15 inches long A string is tied around the rubber tube in between the needles of radium. In this manner, the radium is distributed equally throughout the length of the tube This tube is then placed under the skin and the long end is brought out through the lower end of the incision, while the length of the tube occupies the area normally supplied by the lym phatics, which accompany the internal mammars vessels. We have never been able to detect how this radium in any way seems to interfere with the healing of the incision or the 'taking' and development of the skin grafts

The skin over the chest and avails is beld firmly against the chest wall with the aid of a large sea sponge and is held in place by adhesive straps. The arm is left free and the patient is

made to use it as soon as she is conscious

Less than 1 per cent of our cases have had swollen arms which have given any serrous trou ble We feel that the swelling of the arm when it occurs is due to a low grade infection in the axilla, preventing the regeneration of the lymphatics. This point was demonstrated beautifully in animals by Reichert

Postoperative irradiation will produce slight bronzing of the skin. This is accentuated at the portions of the flap where radium has been implanted where there is frequently marked redden

ing with peeling

Tradiation of the ovaries in young women to produce an artificial menopause should be done every case in which the patient is still mensituating. Our attention was first called to this by Dr. C. H. Peterson. He was giving irradiation to a pelvic metastases for the relief of pain in a case of carcinoma of the breast. After several weeks of treatment of the pelvis by irradiation the primary inoperable carcinoma of the breast decreased markedly in size. The patient ched of carcinomators, but this experience made us thun, of the possible association between an ovarian hormone and maligraency of the breast.

A visit to the Memorial Hospital in New York, will convince anone of some relationship be tween the ovaries and cancer of the breast. There they have roentgenograms of 2 cases with what they thought were metastases in the lung. After irradiation of the pelvis the lung shadows disappears to the property of the pelvis the lung shadows of the

peared Of course, no one can be certain that the lung findings were metastatic malignancies

Herrell, of the Mayo Clinic, studied the relative incidence of cophorectomy with and without carcinoma of the breast. He reviewed approvimately 3500 cases. He found "the incidence of complete cophorectomy or castration was approvimately ten times as great among the noncincer bearing females as in the group of women who developed carcinoma of the breast after cophorectomy or castration." In other words cancer of the breast occurs ten times more frequently in the normal woman than it does in women who have had the ovaries removed.

Our experience with the irradiation of metastases has been briefly as follows. There has been no "cure" in any case. However, the pain of the metastases has been relieved in the vast majority of cases. We have no way to make an accurate estimate as regards the rate of growth of these metastases in comparison with those patients with metastases who have not bad irradiation. However, such patients certainly are made more comfortable by the employment of irradiation even if the rate of growth is not slower.

We feel that irradiation combined with radical surgery is indicated in practically every case and base this opinion on a study of our results

Up to 1920 the percentage of 5 year (or over)

'cures was 22 per cent and during this period
only radical surgery was employed

From 1920 to 1924 radium was added to radical surgery, and in this group the percentage of 5

year (or over) cures was 30 per cent

From 1924 to date with the employment of pre operature and postoperature v ray treatment with a high voltage machine in addition to the radium and radical surgery, our percentage of 5 year (or over) 'cures' is 55 per cent

These percentages include all the patients both operable and inoperable admitted to the Jefferson

Hospital during this 25 year period

By the term cure we do not mean to imply that we ever consider any case of cancer of the breast as absolutely cured but, used the period

of 5 years for comparison purposes

Of course, cancer education has also been a big factor in this improvement of the percentage of so called 'cures," but, it is impossible to estimate accurately this factor. However, I am certain we are still seeing far too many cases of well ad vanced carcinoma. In fact, the interval between the time when the patient first noticed the "lump in the breast and the time she comes for opera tion has remained about the same—the average being about 6 months. No one will deny that intelligently administered irradiation cures superficial malignancies, therefore, it is logical to assume that such irradiation should help to prevent recurrences after operations for carcinoma of the breast. In fact, there has been only one local recurrence following the last 117 operations. Before the employment of irradiation in association with surgery, the percentage of local recurrences was slightly over 5 per cent. To my mind, this alone would justify the employment of intelligently administered irradiation in association with radical surgery.

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KELOIDS FOLLOWING LAPAROTOMY

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THE simplest term in which a keloid may be defined is "a tumor-like fibrinous outgrowth, usually occurring at the site of a scar" (Gould) It may occur in any part of the skin surface as the result of either ac cidental or surgical traumatism. We are con cerned in this short essay only with its presence in laparotomy wounds where to the writer its occurrence seems unnecessarily frequent. The principles involved, of course, apply to incised wounds in any of the skin areas

The normal healing of an incised wound is promoted by first cleanliness, second, the control of active bleeding, third, careful apposition, fourth, and by no means least, the prevention of undue wound tension until its tensile strength

equals that of the surrounding tissues

Absolute asepsis of the skin is an impossible achievement without tissue destruction. Indeed, so says Carrel a few microbes are necessary to excite sufficient local reaction to inaugurate the bealing process 1

This process comprehends, after the foregoing dicta have been observed first the gluing to gether of the adjacent surfaces by a thin layer of coagulum containing fibrin and red and white blood cells second, the production of fibroblasts through mitosis of the connective tissue cells. third, the creation of a new blood supply through the formation of capillary buds, fourth, the inter mingling of the fibroblasts of the opposing sides, creating collagen fibrils with resulting permanent union, and fifth, the final covering of the wound, if approximation is not perfect, with epithelial cells (Christopher)

If the bealing is ideal, there will be noticeable only a linear, almost imperceptible scar-a white fine line containing ultimately an stre ducible minimum of fibrous tissue If the incision hes in the proper direction of the skin tension, there is less danger of the skin spreading than when it is made in an opposed direction. Un fortunately, a vertical incision in the mid abdomen in so far as the skin wound is concerned, does not conform to this requirement

If the phase of fibroplasia, because of interfer ing factors, is developed beyond the requirements of normal healing a keloid may develop. In the healing of wounds by second and third intention, Man The Unknown By Alexis Carrel p 201

the formation of granulation tissue is necessary for epithelization In keloids following burns the disfiguration is sometimes enormous, especially when located on or about the face

Pathologically then, a keloid consists of a mass of cicatricial fibroconnective tissue, composed of coarse hyalinized collagen fibers without elastica (McFarland) It bas no capsule and fades into the surrounding connective tissue. In whites, its color is pinkish red in negroes, in whom it occurs oftener, somewhat darker than the sur rounding skin. As time goes on it sometimes disappears spontaneously Malignant degenera tion is a possibility as in all adventitious growths where either prenatal or postnatal embryonic cells predominate, a theory especially stressed years ago by Conheim, and which bas never been

entirely disproved

The abdomen is made up, from without in ward, of slan, superficial and deep fascia, muscle, subperitoneal fascia, and peritoneum. In the exact midbne separating the recti, no muscle tissue is exposed in making a vertical incision But the several layers vary greatly in the time required for healing after coaptation. Thus the pentoneum, a serous membrane, beals very quickly and fortunately so, for should infection occur, the abdominal cavity is thereby protected Muscle cells, on the other hand, take no part in the process of repair-only the muscle sheaths Skin and mucous membranes heal quickly be cause epithelium has a marked power for regenera tion (Christopher) It is a broad surgical prin ciple in closing all wounds that, whenever possible like tissues should, in suturing, be made to assume their original relationship

We have no cross section of our surgical records showing the frequency of abdominal wound infec tion or the frequency of keloids Unfortunately, most hospitals during our surgical career kept no such records, and we are making no attempt to evaluate our statistics in their entirety. But our private records, covering several thousand cases, in each instance tell the exact method of wound closure, so that years later, when opportunity affords, one can make fairly rehable comparisons

May we say, in passing that at the time of our graduation in medicine, Pasteur's epochal dis covery and Lister's early observations, although made several years before that event, the germ

theory of disease was just beginning to be seriously discussed, and with no small degree of acrimony Our records, therefore, cover more than 50 years of a fairly active abdominal surgeon who has experimented with many and various techniques in making and closing abdominal wounds

Wound infections, cicatrices of all forms, and postoperative hermas are much less frequent now than formerly—thanks to the evolution of a more ideal technique. But keloids, it seems to the writer, still occur all too often. Because of the fact that, when prisent in an abdominal scar, they are less conspicuous than when present in exposed areas, their importance has been under-

Our observations, then, lead us to the following conclusions

- r A blood clot within a flesh wound, while at times serving a very useful purpose in the healing of fractures, often leads to wound infection
- 2 Too great an effort to control all blood oozing by pressure clips frequently leads to tissue necrosis with resulting infection
- 3 The overloading of the wound with catgut, especially when the body resistance is below par, because of age or otherwise, portends danger. The finest strands, compatible with safety, should be used and as few knots as possible left behind for nature to absorb.
- 4 Postoperative oozing can be prevented by reinforcing the opposing surfaces with tension sutures, preferably silkworm gut. These sutures also overcome, during the first few days of healing, all skin tension.
- 5 The bringing together, in closing the skin, of a wider area of raw surface than is afforded by edge-to-edge approximation only, is accomplished by means of Michel clamps. For years before these clamps were introduced, we attained the same objective by means of interrupted mattress sutures, introduced not less than 3 millimeters from the wound edges. This same principle, before the Watkins's technique was evolved, we utilized for a number of years in cystocele and prolapse operations.
- 6 Reheving the skin wound from all lateral tension, with butterfly adhesives, for at least 3 weeks after the patient leaves the bospitan, we consider the most important step of the entire technique. It sums up the especial object of this brief thesis. Nature, wonderfully kind when not handicapped, cannot in the brief interval of 5 or 10 days complete her method of welding together.

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the skin edges so securely that they will remain in close contact indefinitely—hence the wide and unsightly scars which in time all too often develop From the standpoint of artistry, it is not the immediate appearance of the wound that matters so much as its final appearance after I or 10 years have elapsed

We began the practice of abdominal surgery when dependence was placed upon "throughand through" interrupted silk sutures only Those were the good old days of postoperative hermas and cicatrices The sutures were left in situ for 10 days and after their removal, if the abdomen happened to "blow up" with gas, the wound separated allowing the intestines to escape Later, silkworm gut, silver wire, and catgut dis placed the madequately prepared silk, and the results were better but far from perfect. For years we used the subcuticular skin stitch (silk, silver wire, silkworm, or catgut) with ideal immediate results, but with most discouraging mediate results. Wounds thus treated, when the dressings were first removed, won the admiration of one's students But in the patients who have returned to us after several months or years, a larger percentage of keloids has followed in the train of the subcuticular stitch than when in terrupted stitches alone were used. Why this is so we do not attempt to explain Possibly the projecting suture ends favored the entrance of micro-organisms into the wound, or the suture, because of close proximity to the wound edges, interfered with nature's delicate mechanism of healing by first intention. We are especially emphasizing this fact for the reason that the subcuticular mattress suture in skin approximation is now quite commonly used and keloids are showing up with corresponding frequency The surgeon should then, in closing the abdominal wound, keep in mind the fundamentals which we have attempted to summarize The writer's sole object in reviewing them is to lessen the number of keloids which are still all too frequent It is to be regretted that no known method of wound closure up to the present time is 100 per cent perfect But a more thorough knowledge of nature's processes, encouraging rather than antagonizing them, will carry us far in the prevention of unsightly scars. At least this has been our experience

TECHNIQUE AND SUMMARY

Our conclusions can best be epitomized by summarizing the procedure which we follow

I General or spinal anesthesia is used Local

anesthesia, especially when used in excess, has a tendency to devitalize the tissues 1

2 Careful asepsis is never, no matter how rigidly observed, too per cent perfect, therefore, the skin incision is made with scalpel number one Scalpel number two is used to divide the under lying structures. All active bleeding is controlled but moderate oozing is ignored.

3 The operation completed, the peritoneum is brought together with a fine, plain gut suture

4 Three to 5 silknorm tension sutures are introduced from within outward, the same needle never being used twice during the operation Exit of the needles is at least 2 centimeters from the wound edges. The sutures should include, other than the layers of fascia and the recti, the nedge of tissue resulting from the closure of the peritoneum, so that, when they are finally ted, there will be no dead space between the peritoneum and the intervening fascia. These sutures are left untied until the skin clamps are applied

5 The deep fascia, either edge to edge or overlapping, is carefully sutured with chromic gut \o i or , as few knots as possible heing left

6 The skin wound is closed with Uischeldamps so placed as to make it possible to remove them with minimum trauma to the healing skin wound behind. Before the last one or two clamps are applied pressure is made from below up ward with a gauze sponge for the purpose of expressing any accumulated blood or serum from

the wound

This the writer has stressed in his book Cl a of Greecel P p 252 hi ing his tacutical holings.

7 The interrupted sutures are tied over narrow strips of gauze, saturated in 95 per cent alcohol, placed on either side of the clamps, just tightly enough to control all ozoning Unless the clamps are thus protected, unnecessars suffering ensues, both from the tension sutures and from direct pressure upon the clamps when the outer dressings and binder are applied. The alcohol serves a most useful purpose as a destroyer of germs.

8 The tension sutures are removed not earlier than the fourth day and the clamps not enthant the fifth day following the operation after their removal, the skin wound is sustained for at least 3 weeks to the application of butletis and heaves, the wound being protected by an under king step of sterile game. Atheries plastic should never come in direct coulout at the the skin wound, even though its center is smorted—with an entitieptic, for at least to days following the operation. It counse to made absolutely sterile and, when so placed, frequently results in slight skin infection which is often the foretrimer of a kloud

This summary is deduced not, as we have emphasued, from accurate statistical data, which would be quite impossible to obtain from the cave records of any consulting surgeon whose chientels scattered far and wide, but rather from such cases as have subsequently returned to us for examination, or for newly developed symptoms. During the last 15 vers, we have especially stressed for our internes the closing stablicated paragraph with correspondingly better results.

EARLY WEIGHT BEARING IN FRACTURE DISLOCATION OF ANKLE JOINT

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HRET important objectives involved in the treatment of fricture dislocation of the ankle joint are (1) the fricture must be so reduced that complete anatomical position of the frigments be restored, (2) this reduction must be maintained throughout the period of healing, (3) the function of the extremity must be restored in the shortest possible time

r Reduction of the fracture Failure to obtain a complete anatomical reduction will result in arthritic changes about the ankle joint which will cause considerable disability in later life. All though a perfect reduction may not be necessary to obtain a good functional result in fractures about other joints, a perfect reduction is necessary in fractures about the ankle. Slight widening of the malleolh, or displacement of the astragalus, wherein the weight bearing is not distributed to the center of the lower articular surface of the tibia, will cause erosion of the adjacent articular cartilage, with varying degrees of arthritis and ankylosis.

More important than the malleolar fractures occurring about the ankle is the accompanying dislocation or subluvation. Trethowan stresses the point, in discussing this injury, that it is better to consider it primarily as a dislocation of the ankle joint than as fractures of the malleol. The word "fractures," he states, clouds the issue by stressing the less important feature. He prefers the term "dislocation fracture" to the term "fracture-dislocation." The misplaced joint, not the broken bone, is the main cause of the discord and excessive friction in the working parts.

Accordingly, the reduction of this injury should be instituted as early as possible. The main objective is to reconstruct the joint so completely that weight bearing surfaces are in perfect apposition. In the majority of cases, whether the dislocation is lateral or posterior, partial or complete, such reduction can be easily accomplished, if performed immediately after the injury is sustained. On the other hand, the waiting of several days or hours may make such reduction impossible, and may incressitate open operation.

Local anesthesia should be used, and the reducfrom the Service of Dr. S. Kleinberg, Hospital for Joint Dis-

tion should be performed according to the method advocated by Boehler About 20 cubic centimeters of 2 per cent novocain should be injected into the fractured portions of the tibia and fibula and into the ankle joint. The surgeon, seated on a low stool, supports the injured foot on his knee Pressure is applied over both malleoli to dispel the effused blood. The flexed knee relaxes the pull of the gastroenemies. Reduction is then accomplished, depending on whether the dislocation be lateral or posterior. The heel is held in the midling, the forefoot in mid position (not in summation).

Bochler emphasizes the fact that the foot should be placed at right angles to the leg, or in slight degree of plantar flevion. He cautions against dorsifleving the foot, because the front part of the astragulus (which is wider than the back) is forced between the milleoli, and tends to separate them

2 Maintenance of reduction With the methods commonly used, namely, the application of a circular plaster bandage over various thicknesses of sheet wadding, there is a tendency usually for the foot to become displaced. After the swelling subsides, a certain amount of laxity results. The foot is not held firmly fixed in the plaster, and the muscle pull that is permitted will often cause a displacement Dickson, in discussing posterior marginal fractures of the tibia, applies a plaster cast extending above the knee, which is held in moderate flexion to avoid a possible recurrence of the posterior dislocation and displacement of the marginal fragment After 2 weeks, the portion above the knee is removed. A number of surgeons advocate an open operation and fivation of the fragments with wires Dieterle describes 2 cases in which he used wires, I with an open and the other with a closed reduction, and he advocates such method of procedure in marginal fractures

In the type of cases presented, I have found these procedures to be unnecessary, provided one uses a properly applied non padded plaster such as advocated and described by Boehler After the fracture is reduced, a plaster splint is placed directly over the skin on the lateral aspect of the leg and foot, in stirrup fashion This is incorporated in a flannel bandage, and a second splint



I ig I Case r Posterior dislocation of the ankle with fractures of shaft of tibula lateral malleolus and posterior margin of the tibia

I ig 2 Immediately after reduction The ankle has been

is fixed over the posterior aspect of the leg and sole of the foot Two or three circular plaster bandages are applied. Firm pressure is main tained over both malleoli while the plaster is hardening. Without sheet wadding and with the plaster adhering to the hairs of the skin, no motion is permitted at the ankle. The plaster should be used merely as a retentive bandage, never as a corrective one.

If the reduction, as checked up by postopera tive reentgenograms, is satisfactory, not only will this plaster hold the fragments in position but also early weight hearing may be permitted with out fear of subsequent displacement of the fragments

3 Restoration of function The average dura tion of disability in those cases in which no weight bearing is allowed is about 6 months or longer Dickson in his article referred to, does not permit immobilized in a well fitting non padded plaster i Fig 3 On removal of the plaster is weeks after in Position of fragments maintained in spite of weight is ing Note absence of osteoporosis

weight bearing before 8 weeks. Trethowan li wise cautions against weight bearing before 6 8 weeks The fear, of course, is that of displa ment of the foot Without weight bearing at phy of the muscles and osteoporosis of the ho of the leg and foot result. The ankle hecor stiff Weight bearing is now a painful procedu and several weeks of active physiotherapy foll before the patient is able to hear weight with discomfort. The patient uses his crutches i only while the plaster is on, but also for ma weeks after the plaster is removed. Then weis bearing without support is a cautious tedious p cedure until the muscles become active, the anl soint mobilized, and the hones regain their norn texture

In the cases presented a walking iron is a corporated in the plaster and, after a few dathe patient is permitted out of hed. Wh



Fig. 4 Case 2 Tri malleolar fractures of the ankle with lateral dislocation of the foot Fig. 5 Complete reduction of the fractures and disloca

tion A non padded plaster of Paris cast has been applic Fig 6 After removal of the plaster 7 weeks later. Fin caffus, no displacement of fragments no osteoporosis

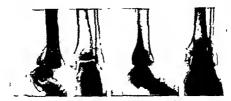


Fig. 7, left. Case 3. Posterior marginal fracture of the tibia with posterior dislocation of the astragalus.

Fig. 8. Nine weeks after reduction and early weight bearing. Healing with maintenance of reduction.

crutches are permitted, the patient learns to depend on the crutches for support and can be encouraged to discard them only with difficulty When a cane is used, the majority of patients can learn to walk without any difficulty after a week Many can get along even without the cane The plaster is maintained for 8 to 10 weeks, depending on the severity of the injury. During this time, they are actively using their muscles. The circulation of the extremity is maintained, the swelling of the toes disappears quickly, bone atrophy from disuse cannot result. On removal of the plaster a fairly good range of motion at the ankle joint is found in most cases. The calf muscles of the affected leg are only slightly weaker than those of the other leg Roentgenogram will show no osteoporosis, the patient can immediately bear weight on the foot without pain Usually, 2 or 3 weeks of physiotherapy are required to mobilize the ankle joint completely The average duration of disability is to to 12 weeks To prevent the swelling that occurs after removal of the plaster, Boehler uses an Unna paste boot I have found a flannel bandage (applied after the leg and foot have been well painted with mastisol solution) or an elastoplast bandage to be just as effective Massage and prolonged physiotherapy are not indicated when subsequent swelling is prevented

Case r Female aged 27 years, sustained an injury to the right antie in April, 1933 She was 8 months pregnant at the time and weighed about 25 to 30 pounds over her usual weight Roentgenograms (Fig 1), showed a com plete posterior dislocation of the foot, with fractures of the internal malleolus of the tibia, posterior margin of the tibia and shaft of the fibula Reduction was performed the same day under local anesthesia, and a non padded plaster boot was applied Postoperative roentgenograms (Fig. showed complete reduction The patient was out of bed within a week and, because of the pregnancy, was per mitted to use crutches She was delivered I month after the accident, and remained in bed for a weeks Then weight bearing was cautious, crutches were discarded a week later Because of the non weight bearing period, the plaster was maintained for 10 weeks Roentgenograms taken after maintained for 10 weeks a company that it was a maintained throughout the period of weight bearing good union had resulted About 20 degrees of plantar, and 20 degrees dorsifiction, were present at the ankle joint, and a fair range of lateral motion. To prevent subsequent edema of the extremity, an elastoplast bandage was ap pfied for 2 neeks At the end of 31/2 months from the day of injury, a complete range of painless motion was ob tained



Fig 9 Case 4 Poll's fracture with lateral subluxation the fool

I ig to Reduced and immobilized in a non-padded plaster

Fig 71 Nine weeks after reduction. No weight bearing Note the osteoporolic changes in bones of the foot which are present

CASE 2 Female aged 65 years fell and injured her left ankle Roentgenograms (Fig 4) showed a lateral disloca tion of the ankle with fractures of the fibula internal malleolus and posterior margin of the tibia. Reduction under local anesthesia was performed on the same day a non padded plaster was applied Postoperative roent genograms (Fig. 5) showed complete reduction of the dis-location with the fractured fragments in satisfactory aline ment Despite her age and the extent of the injury the patient was permitted out of bed at the end of a week. For the first few days she learned to bear weight on the walk ing iron incorporated in the plaster. No crutches were permitted the patient learning to rely on a cane for support At the end of 3 weeks she was able to walk around the house without much difficulty. The plaster was main tained for 7 weeks and on removal roentgenograms (Fig. 6) showed that reduction had been maintained in spite of early weight bearing with good callus formation and little if any osteoporotic changes in the bone. She required 4 neels of physiotherapy. The total duration of disability was less than 3 months

casa unity was sees than a months
CASE 4 Female aged 55 years sustained injury to right
ankle on February 25 1933 Roentgenograms (Fig. 7)
showed a posterior marginal fracture of the tiba with
posterior dislocation of the foot similar to the cases de
scribed by Dickson 'Uthough from an 1-ray standpoint; reduction would appear less difficult than in the cases cited previously it was more difficult actually. The astragalus was impringed in back of the tibia reduction was accomplished with a great deal of difficulty. It was necessary to place a flannel bandage in back of the heet and to use a considerable amount of force to effect reduction Local anesthesia was used Following immobilization in a skin tight plaster postoperative roentgenograms showed an excellent reduction. The nalking iron was applied weight bearing without crutches was begun in a week. It the end of 3 weeks the patient was able to walk more than a block at a time Rocotgenograms were taken during this walking interval to check up the position of the fragments On removal of the plaster on May 1 about 9 weeks later a good solid bony union was obtained (Fig 8) to bone atrophy was found no pain when weight was borne Full active function was restored in 3 to 4 weeks The total disability was about three months

CASE 4 This case is presented to show the effect of non was the case of the duration of disability. The patient a femalle aged as years injured her right ankle on February 7 1936. Roentgenograms (Fig. 6) showed a simple Pott is fracture with a lateral subluviation of the astragalisand fractures of the milleoil. Reduction (Fig. 10) presented no difficulty and the usual skin tight plester and

walking from were applied. The patient lived out of town and hence careful instruction was given as to early weight bearing Crutches were prohibited. She returned on April 11 about o weeks after injury she walked with aid of crutches but was unable to bear full weight on the ex tremity She had failed to follow the advice given because her friends had persuaded her that crutches were necessary and that she had misunderstood instructions. On removal of the plaster poentgenograms (Fig. 11) showed ostenporosis with mottling of the bones of the foot and about the ankle Pressure on the foot was sensitive and painful and she was unable to bear weight on the foot Motions at the ankle were restricted and painful. She received the usual baking and massage but because of pain was unable to discard her crutches for 4 weeks after which a cane was used for support for 2 months making the duration of total disability and acts e treatment run for a total of 5 months.

SUMMARY AND CONCLUSIONS

t Three different types of fracture dislocation of the ankle are presented, wherein immobilization in a non-padded plaster was followed by

early weight bearing

2 When properly applied, the plaster will
maintain the reduction throughout the weight

bearing period
3 Weight bearing stimulates callus formation,

prevents osteoporosis of the bones
4 Constant use of the muscles prevents atro-

phy and stiffening of the ankle joint
5 The period of total disability is consider
ably reduced

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METHOD OF INTESTINAL ANASTOMOSIS WITH A NEW CLAMP

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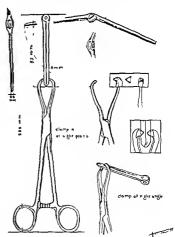
T may be said of the making of clamps to aid in intestinal anastomosis, as of the making of books, that there is no end Many of the men especially interested in intestinal surgery have devised, adapted, or modified some appliance for gut anastomosis, but the writer had always supposed himself immune to this general weakness Pride goeth before a fall The instrument herewith presented has proved useful for end-to-end, end to side, and side to side types of operations, in an ample experience, and it is hoped

that others may find it worth trying

The clamp is used in a so called asentic type of suturing, the general principles of which have been developed in the Parker-Kerr and various other procedures It acts to close the lumen of the gut during the placing of the sutures, and is withdrawn before the final tying of the sutures In this form of anastomosis, it is important that the blades be as narrow as possible, so that very little bowel wall will be inverted, otherwise the inverted wall may act as a flange or diaphragm and encroach seriously on the lumen A number of men use ordinary clamps with the blades ground narrow for this purpose In some cases such clamps, because the compressive force acts through the hinge and the blades are long and narrow, tend to slip off the gut, or the tips gap apart a little or slip sideways on each other It was principally to correct this weakness that the clamp herewith described was devised. It has other advantages also and these will be mentioned later

The clamp consists of two pieces, the hinged iaws and the compressing handle. The jaws are long, narrow, and serrated longitudinally Close to the outer surface of each jaw tip, a square pyramidal hole is sunk to receive the squared pyramidal points of the compressing handle. The handle is made like any other clamp of the hemo stat type operated with finger rings and a ratchet catch, but its blades are bowed like ice tongs and the tip of each blade ends in a squared point to be fitted into the sockets in the tips of the hinged jaw piece The illustrations make this clearer than a lengthy description and also give dimensions The latter, of course, may be altered for various purposes

The technique, for instance of end to end su ture, is as follows. The gut is crushed across at the desired levels by crushing clamps leaving a groove The hinged jaw piece of the clamp herewith described is placed across the gut at the crushed groove and solidly locked in place by setting the handle piece firmly into the sockets in the tips of the jaw piece. The portion of gut to be removed is cut away with the cautery close against the anastomosis clamp. The same process is applied to the other end of the gut to be resected, and the ends to be anastomosed, held firmly by the special clamps, are brought closely together, end to end A continuous suture of median silk unites the gut walls of each end behind the clamps, which are rotated slightly away from each other during the placing of the suture



I ig r Details of the clamp with dimensions and positions

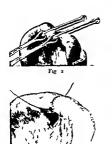






Fig 2 Manner of placing clamps on bowel before resection of gut.

Fig. 3 Gut resected. Ends to be anastomosed brought side by side. Posterior continuous suture being placed behind clamps. Fixation handles omitted from sketch for implicity. The two ends of this suture are to be tied.

Fig. 4. Anterior suture being placed over clamp blades. Handles omitted for simplicity. Fig. 5. Clamps withdrawn. Anterior uture pulled spig closing anastomosis. Ends of anterior and posterior utures tied together.

The ends of this posterior suture are tied Now the clamps are rotated toward each other and a similar suture unites the gut wall in front of the clamps but in this suture the ends are not tied but left loose so that the stitch may be drawn taut after the clamps are removed. The compressing bandles are now released from the up of the hinged laws and set on the hinged joint end instead By gentle pulling the jaws are with drawn from between the rows of sutures, front and back the front row being pulled taut as the jaws of the clamps are slipped out. The corre sponding ends of the front and back sutures are tied together and the anastomosis is accomplished It can be further supported by an additional row of mattress or continuous sutures if so desired

The squared holes and points of the jaw and handle pieces permit the assembled clamp to take three forms law and handle may be set together

in the same long axis so that they form a straight line with each other, or they may be clamped together with the handle and blade at right angles to each other, the angle being directed either to the right or left of the surgeon as he may elect. In certain positions this has considerable advantage. For instance several anterior resctions of growths rather low in the sigmoid have been done with these clamps. The clamps on the stump of gut are put on with jaws and handle at right angles to each other which permits manuplation in the confined space of the pelvis that would be

impossible without this feature. In summar, the clamp posseses firmness and security for use in the aseptic" type of anistomosts by applying compressive power to the tips of the blades, and also has adaptablisty because it may be employed as a straight or right angle clamp.

TWO STAGE LOBECTOMY IN THE POOR RISK PATIENT WITH THYROTOXICOSIS

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REVIOUS to the introduction of iodine as a specific preparatory measure in surgery of the thyroid gland, multiple stage operations such as polar ligation, and, less frequently, lobectomy in two stages were a necessary and frequent procedure Since the specificity of iodine in the preparation of the usual thyrotoxic patient has been so universally accepted, the use of multiple stage operations has greatly de-However, there has been perhaps a failure of appreciation of the lact that while iodine adequately prepares the large majority of thyrotoxic patients, there is still a constant group of patients whose reaction to iodine is inadequate to prepare them for the complete operation, and as a consequence the mortality is sufficiently high to cause one to realize that this is not the procedure of choice. In a large charity service, such as is seen in the Cook County Hospital, in which intensely toxic, neglected, or overiodinized patients are perhaps more frequently seen than in the usual better class groups, we have been faced with the necessity of developing a procedure that would suit the patient, rather than of subjecting the patient to a standardized procedure

Our earlier efforts in this direction practically were confined to one of the various types of polar ligation. From that experience we cannot agree with the advocates of this operation that such a procedure is followed by constant improvement sufficiently great to warrant it as a step in

surgical therapy

Polar ligation presupposes the vascular supply to and from the thyroid gland to be partially or completely reduced by that procedure. However, anatomically the vascular supply from the superior thyroid artery anastomoses freely with the inferior and superior thyroid vessels of the other side, and, in addition, the arteria thyreodea ima, even though inconstant, may arise either from the innominate or from the aortic arch, or may coexist with the inferior thyroid artery or even replace it. Further vascular supply comes also from the prethyroid muscles and periglandular tissues. It has been shown that the arteries of

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the thyroid anastomose so thoroughly with those of the trachea and the esophagus that the trunks of all the thyroid arteries may be ligated without fear of necrosis of the gland (r)

Normally, then, there is this rich vascular supply to the gland, but it must be remembered that in thyrotoxic disease this normal vascularity is markedly increased. Polar ligation does not attempt to obstruct all such vessels, but only one or more of the main supply, thyroxin should have, consequently, no difficulty in gaming entrance to the systemic circulation in quantity.

Lahey agrees that ligation of all four poles does not cure the disease, but believes it amchorates the symptoms in about 66 per cent. He speaks of the technical difficulty in exposing the artery and vein, and of the danger of tearing into the internal jugular vein in attempting ligation of the inferior thyroid vessels. There is no doubt but that the operation of ligating the superior and inferior vessels is a technically difficult procedure. especially in those instances in which one is dealing with a large gland in which the anatomic relations are not normally placed. In working through a small incision with venous bleeding constantly obscuring the field, all difficulties are greatly enbanced These technical difficulties may, of course, be obviated by visual ligation following flap exposure of the structures, but such a procedure assumes the magnitude of the bilateral subtotal thyroidectomy It is often a question whether or not in ligations attempted through small incisions, the vessels exposed and tied are correctly identified

Because of the vascularity of the gland and its inherent richness and anastomosing blood supply, or perhaps because of the occasional failure to ligate the proper vessels either numerically or anatomically, we do not believe that polar ligations are usually followed by sufficient improvement. With this thought, a tentative approach was made to the problem by initiating the procedure of lobectomy in a selected group of cases which ordinarily would have been subjected to polar ligation. The results would seem to show that if a patient is a sufficient risk for polar ligation, he may undergo, with practically equal safety, a unlateral subtotal lobectomy with a

1

TABLE I

	Two lobecterates	One lobectom
iverage age—years iverage high basal metabolic rate on	3S 1	41 2
entrance iverage basal metabolic rate follon	58 8	44 8
ing 1st stage lobertomy iverage time between operations-	26 8	12 5
months	4 4	
Type of disease		
Thyrocardiacs	9	6
Toxic	9	7
Iodine resistant	3	•
	_	_
	23	13
Type of gland		
Frophthalmic goiters	22	6
Toxic adenomas	I	6
		_
	23	13
iverage duration of disease-years	1 41	1,8
ongest duration—years	5	4 5
hortest duration—months		2
fortality—cases	۰	1
Total cases	23	13

resultant improvement far greater than could be expected by one or more successive ligations We are able to report at this time a senes of 16 such lobectomies 2, of which were completed by removal of the remaining lobe. There are 14 of these poor risk patients who have had one lobe removed 1, of whom at the present time have refused further surgery because of the marked improvement in their condition. There has been one postoperative death in this group occurring in a patient with mitral stenosis and beginning cardiac decompensation

It is of importance to note that in this series an average reduction in the metabolic rate following removal of the first lobe occurred from an average height of 58 5 per cent to 26 8 per cent within a maximum period of 4 weeks and so great was the improvement in many of these cases that they were convinced with difficulty as to the necessity of completion of the operation As we have stated before, 1, of these patients would not return hecause of what they felt to be a complete cure This factor is in itself of extreme importance, because in our experience, their improvement will in all cases be temporary and an exacerbation of their symptoms will he the rule and not the exception

In general, it may be said that the indications for a lobectomy may be classified as those which usually have been advanced for polar ligation (4) Specifically, they may he classified into the

following groups

TABLE II - TYPES OF DISEASE-SINGLE LOBE REMOVED WITHOUT COMPLETION OF OPERATION

	1 _{cr}	Basal metabol c rate before	Complication	Daration of disease
		Thy	rocardiac	
N H	6s	31	Card ac a thma with abrillation	2 years
R C	10	10	Marked card ac	1 Year
вн	40	57	Double m tral with suncular fibrillate n	s months
F D	54	53	Angina pectoris	over 1 year
u s	42	57	Cardiac asthma	1 Year
E D	\$3	15	Hypertension	1 FEAT
Intensely Torse				
c.z.	50	68	Fibrillation	3 Franç
D L	30	23	Hypertengon	3 years
J F	53	47	Arteri siclerosas	2 years
3 8	45	42	Iodine resistant	2 years
N K	41	45	Recurrence	r year
\$ 4	41	5;	Hyperten ion	2 Zetur
L K	20	52 [lodine req tant	z year

1 Intensely toxic cases in which patients do not respond satisfactorily to the usual iodine preparation

2 The so called todine resistant glands

3 Those with outstanding cardiac manifesta tions not responding satisfactionly to treatment, whose symptoms are due either to primary thyrotoxic myocardial degeneration or are super imposed on an organic heart disease

1 Those of advanced use with systemic arteriosclerotic changes

5 Those with such associated pathology as would make them poor risks for any surgical procedure

From the cases charted as shown, the most frequent indication for this procedure is in the group of intensely toxic patients. This group includes those that show little or no response to iodine medication or are iodine resistant because of previously prolonged attempts at iodinization

As is shown in Table III, the average drop in the basal metabolic rate following removal of the first lobe was 55 5 per cent There were no cases included in this group which showed a failure in satisfactory reduction in metabolism following the primary lobectomy, nor are there any cases which show a stationary metabolism or a tend ency to elevation. All of these metabolic rates were taken at the time of discharge of the patients from the hospital following surgical recovery from their lobectomy, and demonstrate not only the percentage of metabolic recoveries, but its rapidity following the initial operation

These statistics may be compared to those recently published by Lahey and Schualm, who report in their series an increase in the basal metabolic rate in 28 per cent of their patients, no change in 6 per cent and a reduction in the rate in 66 per cent of patients following pole legation

In our group of cases attention also may be called to the rapidity with which the drop in the metabolism takes place, and the comparatively low basal metabolic rate which precedes completion of the operation. As we have stated previously, the ease with which these patients pass through their postoperative course following removal of the second lobe is very much greater than is the course usually seen following the complete operation in the good risk thyroid patient

In contradistinction to the usual procedure of maintaining patients on iodine therapy during the period elapsing between pole ligation and subsequent hemithyroidectomy or bilateral subtotal thyroidectomy, it is our belief that in the period between the stage operations of lobectomy the use of rodine is not indicated after their discharge from the hospital (2) The complete iodinization of the remaining lobe that has taken place in the course of the operative preparation should be sufficient to carry these patients during the interval between operations, which optimum time should be from 6 weeks to 2 months. The elimination of iodine therapy during that period lessens the possibility of overiodinization, with a resultant increase in risk to the patient from that complication at the time of the second operation After such a rest period, their response to iodine as a preparatory procedure in the usual manner preceding removal of the remaining side has been extremely satisfactory in all of our cases

Since overiodinization is one of the frequent indications for multiple stage operations, it is hardly logical to invite this complication as a possible factor previous to the removal of the remaining lobe

We feel that in the operation of lobectomy there exists a procedure that can replace the operation of polar ligation without increasing the risk of It would seem that if a patient who mortality is nominally a subject for polar ligation is subjected to a lobectomy the mortality should be no greater, but the consequent improvement should be so much more marked than that following

TABLE III -CLASSIFICATION OF COMPLETED

OPERATIONS							
Interval		T -	Basal metabolic rate			Duration	
Case bets	between operations	between Age	Before	After one lobe	Γnd*	of disease	
	Indine Resistant						
S L	5 months	zo.	54	15	11	1 years	
T B	3 months	45	52	18	8	5 months	
l #	6 months	46	72	47	14	6 months	
K H	2 months	31	62	32	6	2 years	
11 11	6 weeks	25	75	37_	10	2 3 cars	
Thyrocardiac							
мс	a months	48	31	12	-22	g months	
J P	6 weeks	20	59	7	?	6 months	
1 S	3 weeks	44	40	20	-	3 months	
M C	3 months	so	46	38	4	5 years	
F C	8 years	38	40	28	14	1 year	
S D	2 months	41	83	32	7	2 3 cars	
A W	6 months	46	42	33	11	3 years	
MC	3 month	30	72	23	8	o months	
A Z	8 weeks	44	50	25	-8	3) cars	
Totic							
мъ	4 m inths	36	74	,	-3	g months	
LS	4 months	57	86	13	-2	5 3 ears	
ΕE	2 years	16	52	27	15	2 months	
L B	7 months	34	51	25	7	6 months	
II L	3 months	21	78	32	18	6 months	
мч	6 weeks	18	82	18	11	t year	
1 Z	2 neeks	24	52	40	10	3 months	
TC	2 weeks	43	57	17	13	5 months	
ALB	9 months	41	44	10	-2	8 months	

44 58 8 Percentage of 55 5 drop in basal metabolic rate
*Time of basal metabolic rate taken following completion of operation

Average

26 S

polar ligation that the subsequent operation of completion may be undertaken with a risk less than that usually associated with a bilateral subtotal thyroidectomy in a good risk patient

CONCLUSIONS

- Thirty-five of 36 thyrotoxic patients who were too poor risks to withstand a hilateral subtotal thyroidectomy have been successfully operated upon by the method of two stage lobectomy
- Thirteen of 35 patients have refused subsequent operation following primary lobectomy because of the marked improvement in their general condition

- 3 Primari lobectomy in this series has reduced the average basal metabolic rate from 58 5 per cent to 26 per cent, or a percentage reduction of 55 5. There has been a definite drop in the basal metabolic rate in each instance.
- 4 The postoperative course following the removal of the second lobe is usually milder than that following hilateral subtotal thyroidectoms in the good risk patient
- 5 Two stage lobectoms in the poor risk patient with thyrotoxicosis would seem to be the operative procedure of choice, and may replace the operation of polar ligation

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PONTOCAINE SPINAL ANESTHESIA IN UROLOGY

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UR experiences with pontocaine as a spinal anesthesia in 1000 urological operations serve as the basis for this study The introduction of pontocaine as a local anesthetic by Schmidt (28), Weidhopf (37), Fussganger and Schuman (8) in 1931 was almost immediately followed by its use as a spinal anesthetic, Schmidt (30, 31), Pfitzner (24), Lundy (14), Esser (5), and Marvin (17) Ever since Emborn introduced procame, 1904, a search has continued for an anesthetic of similar, but more prolonged action with less blood pressure depression when used intraspinally It was early believed that all amino-benzoic acids, alkylamino-benzoic acids, di amino-benzoic acids, and amino cinnamic acids could form the basis of alkamine esters which would produce as satisfactory, but more prolonged anesthesia than pro-Pontocaine is one of the results of this search and is structurally the monohydrochloride of the beta dimethyl amino ethyl ester of 4 butylamino-benzoic acid It is a white crystalline powder with a melting point of 146 to 147 degrees C, which is easily soluble in distilled water or normal saline A I per cent solution is not affected by alkalies in glass, will stand prolonged and repeated heat sterilization, is not changed by brief freezing, remains stable for long periods, is crystal clear, has a hydrogen ion concentration of 5 8, and a specific gravity of 1 0068 at 25 degrees C which compares with spinal fluid averages of roor to roog

The toricity of pontocaine has been adequately studied by competent observers, but we believe it correct to speak of an absolute, and a relative

or clinical toxicity

Wedhopf demonstrated in a comparative study of toxicity of similar agents that upon intravenous injection, procaine produces death at the dosage of 55 to 60 milligrams per kilogram of body-weight, while pontocaine's lethal dose on the same scale is 6 to 10 milligrams. Upon subcutaneous injection, procaine has a death point of 450 milligrams per kilogram and pontocaine has one of 20 to 30 milligrams per kilogram

Fussganger and Schuman conclude that pon tocaine is about 9 times more toxic than procaine, and death is due to respiratory paralysis Runge

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and Schmidt have concluded that, comparatively, pontocaine is 6 times more toxic than procaine on intravenous dose, but when used on basis that clinically 1 milligram of pontocaine is equal to to milligrams of procaine, then pontocaine is actually less toxic This conclusion is repeated by Schmidt a year later (31) Lundy and coworkers (14, 15) repeated studies on toxicity and conclusions were obtained similar to those of other observers Marvin states if procaine is given a value of 1 on intravenous toxicity tests, then pontocaine is 58 times more toxic, but intraspinally no alarming reactions occurred with either drug in clinically standardized doses comparison showed that 20 to 30 millimeters of mercury drop is the average systolic fall after procaine, but o to 10 millimeters of mercury drop is the average after pontocaine

In the laboratory studies, death from a toxic dose was always due to respiratory failure, because the heart beat continued for some additional time (8) In the only deaths reported following pontocaine (2, 19) the patients ceased breathing some time before the beart stopped From clinical and laboratory studies following toxic doses of procaine, it is demonstrated that life can be saved if artificial respiration is carried on until spontaneous breathing returns (45, 15) Lundy (5) revived a dog after 71/2 bours of artificial respiration following a lethal dose of procaine Similar conclusions apply to pontocaine The fate of pontocame is analogous to that of procaine on which extensive studies of Dunlop and Essey (15,5) proved that it is the liver that removes procaine from the blood

From the clinical aspect, toxicity, is judged by gastro intestinal reactions, blood pressure and respiratory changes, length of anesthesia, postoperative neurological sequela, and deaths attributed to the anesthesia. In our series of 1000 operations, there were 65 patients who complained of gastro intestinal distress—58 being nauscated, 7 tomiting. This reaction invariably occurred early in the anesthesia, usually in nervous individuals, and disappeared in 10 to 15 minutes. In several instances it followed too rapid intraspinal impection. Blood pressure readings showed an average fall of 12 millimeters with a maximum of 22 millimeters and a minimum of 4 I is a sumform finding of most investigators that ponto

came spinal anesthesia induces only a slight blood pressure fall (2, 3, 6, 9, r9), which is uniformly less than that observed with procaine (41) Respiratory disturbances occurred in 148 of our cases Shallowness complained of by patient for first ro to 15 minutes was noted in 87 There were 61 patients requiring moderate stimulation of carbon dioxide and oxygen inhalation for brief periods to overcome transient shallow respiration

The length of surgical anesthesia has averaged beyond 2 hours (as we rarely tested to deep needle puncture after that time) The shortest duration was 11/2 hours, the longest, 3 hours and 5 minutes The sensation returned on an average of 63/2 hours after the intraspinal injection and move ments became voluntary shortly after the sensa

tions were perceptible

The neurological sequelæ were normal spinal fluid was examined in 100 cases of con veniently available patients, and fluid obtained at 24 hours on 14, 48 hours on 23, and after 5 to 7 days on 6, At 24 hours an increase in protein was always present, and cell counts varied from to to 60 Glucose was occasionally present At 48 hours albumin occasionally was present, cell count o to 15, postoperative headaches never complained of, and reflexes responded as on entrance at physical examination The c to 7 day postoperative specimens showed all normal findings except in 2 patients with syphilis the patients 250, who have been seen t and 2 vears after operation, normal findings were observed Schmidt (30) reported on a controlled group of 510 pontocaine spinal anesthesia pa tients. He had a neurologist examine his patients after 24 to 48 hours, and found normal reflex signs, with spinal fluid changes of slight increase in cell count rise in protein, and occasional presence of albumin, all of which were returned to normal findings 60 hours after operation There were less than 5 per cent headaches At the end of 1 year, the same neurologist examined the same patients and reported all normal findings Postoperative findings reported by Bull and Esselstyne following pontocaine show no cases of shock, no headache, no neurological sequelæ normal spinal fluid cell counts but 2 unex plainable deaths, probably due to the anesthetic

The efficiency and duration of pontocaine in duced spinal anesthesia depend upon the method of administration, the controlling factors being the rapidity of injection of the anesthetic, bar botage, the volume injected, the level of the injection, the miscibility of the drug with spinal fluid, and, finally, the position of the patient immediately after the injection. Our procedure

is as follows Ephedrine sulphate so milligrams in I per cent procaine is used to anesthetize the spinal needle tract in all patients with blood pressure up to 150 millimeters of mercury, systolic For hypertensive cases no ephedrine is used Ephedrine is a direct stimulant to the respiratory center (30) and the coronary (47) and peripheral vascular control (42) Its use in spinal anes thesia was introduced by Rudolph and Graham (44) and Ockerblad and Dillon (43) The lumbar space is chosen and a No 22, short bevel spinal needle is used for the puncture, and the pontocame used is a r per cent stock ampul solution The patient is placed level, on his side

The technique for patients of 135 pounds or

over is No preliminary sedatives except to children We prefer to administer sedatives, as needed, in the operating room

For bladder, pelvic, lower extremity surgerythird and fourth lumbar space for I hour, I s cubic centimeters of pontocaine with 05 cubic centimeter of spinal fluid for 1 to 3 hours, 175 to 2 cubic centimeters of pontocaine, no spinal fluid aspirated

For up to draphragm stomach, intestine, gall bladder, kidney, and scrotum-first and second lumbar space for 1 to 11/2 hours, 1 75 cubic

centimeters of pontocaine with I cubic centi meter of spinal fluid, for 1 to 3 hours, 2 cubic centimeters of pontocaine with 1/2 cubic centi meter of spinal fluid

The average working dose is 1 75 cubic centi meters for short cases and 2 cubic centimeters for long cases

Injection is at the rate of 2 cubic centimeters ner minute

The dose for patients under 135 pounds is tigured as a cubic centimeter of a per cent solution for each 100 pounds body weight and to this is added 1/4 cubic centimeter more for prolonged cases Two cubic centimeters is the maximum dose

The patient is turned on his back, kept level, and a pillow is placed under his head. After 10 to 15 minutes, the pontocame becomes fixed in the tissues and any position desired may be assumed A warm sensation occurs in feet and ascends the legs anal reflex and motility dis appear and sensation loss to the upper abdomen followed by motility loss, is the usual process Return of sensation and motility occurs in reverse order after 6 to 7 hours

A cold towel is applied to the forehead Unless surgically contra indicated, we always allow a liberal sucking of ice. If the operation is continued more than an hour, a hypodermic of morphia is then given in order to prevent restlessness Upon return to bed, the patient may he flat on his back or turn on his side, and bave a pillow, and start taking fluids After 6 to 8 hours, if no nausea has been present, we allow a light food intake, unless surgically contra indicated

The induction is smooth and rapid with an average time of 6 minutes for the appearance of Perfect anesthesias were surgical anesthesia present in 959 patients, partial anesthesias in 40, of which a few required additional local anesthesia or a few inhalations of nitrous oxide Complete failure of anesthesia occurred only once. It is of interest to note that the r failure and 40 partial failures all occurred in the first 500 cases and the last 500 were perfect, indicating that failure of anesthesia was probably due to faulty technique The recovery from anesthesia has been uniformly smooth after about 6 to 7 hours

We have found that the use of pontocaine is indicated in all types of urological surgery as follows

Cases	Spinal anesthesias
Transurethral resection, prostate	
261 patients—2 stage	522
41 patients—1 stage	41
Cystoscopy (drfficult cases, litholapavy,	
etc)	43 61
Suprapubic cystostomy (stone, tumor, etc.) 61
Suprapubic prostatectomy (39 2 stage)	78
Renal surgery	78 63
Cartinoma, penis	3
Urethroplasty	22
Manipulation for ureteral stone Scrotal surgery—epididymotomy, hydro	78
cele undescended testes, orchidectomy	42
Permeal prostatectomy	1
Perineal surgery-abscess, tuberculosis etc	42
Ureteral transplants	4

Its distinct advantages are many, particularly the non-toxic effects on the renal function as compared with those of inhalant anesthetics. Since most urological surgery is undertaken on patients with some renal impairment, the use of pontocaine increases our margin of safety Pontocaine, as was shown, has little to no effect on the blood pressure In prostatic surgery, we frequently do a suprapubic puncture cystostomy with electrocoagulation of the prostate, depending upon the condition present at the first examination, waiting 6 to 7 days later to do the resection. This method was reported by us previously (46) In each of these procedures, surgical judgment is not hurried by a fading anesthesia, and in the rare cases of unexpected and difficult bleeding ample anesthe sia persists for producing perfect hemostasis. In many of the plastic procedures, the time required is longer than anticipated, but we do not have to hurry In renal surgery and in intra-abdominal ureteral transplants we obtain perfect relaxation and freedom from gastro-intestinal disturbance and as well sufficient time to cope with difficult situations

Our youngest patient was ir years and the oldest or years of age Of the men, there were 867 spinal anesthesias, 270 of which had pontocame spinal anesthesias twice, 6 had received it 3 times, and I had had it 5 times Spinal anesthesia was given to 133 women, and of these 107 had it once, 13 had it twice

Two hundred patients were asked their own preference, as to anesthesia. Of this number 49 had once been subjected to inhalation anesthesia. and 38 said they preferred the spinal, of the 151 remaining, 131 said they would prefer the spinal method if a future anesthesia were necessary and 20 said they did not like it

In this series, there were no deaths attributable to spinal anesthesia

CONCLUSIONS

Pontocaine spinal anesthesia has been very satisfactory to us in urological surgery slightly more toxic than procaine but when skillfully used no untoward reactions have occurred

Its distinct advantages are smooth induction. perfect anesthesia for up to, and possibly beyond, 2 hours, complete absence of blood pressure depression, absence of disturbing gastro-intestinal reactions, smooth recovery, and total absence of neurological sequelæ

The safety of any spinal anesthesia depends most upon the skill and experience of the administrator

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SEPTEMBER, 1937

EMPIRICISM IN MEDICINE

LTHOUGH medicine is generally credited as being one of the highly specialized branches of science, there are probably few sciences in which empiricism is used more frequently than in the treatment of disease. It is not difficult to see why empiricism has obtained such a hold in medicine when one realizes that the majority of ill patients will recover irrespective of the type of therapy used Unless one is critical and analytical in his deductions, a particular therapeutic measure is likely to be given credit for improvement or recovery in disease when spontaneous resolution of the process is responsible for the recovery Another reason why empiricism has continued to persist in medicine is because of the difficulty of draw ing conclusions in clinical cases unless an extremely large amount of material is available The number of variables in a group of cases does not permit standardization of all factors and in this way makes logical conclusions concerning the effects of therapeusis extremely difficult

Fortunitely, at the present time clinicians are relying more and more upon laboratory investigations and in this way are able to minimize the number of variables in a given series of observations so that logical conclusions can be drawn. Also the present day medical student is taught to think logically and not to accept as undoubted truth the teachings of his preceptors and predecessors.

Although Hippocrates had suggested the more or less modern conception of the physiologic treatment of wounds, Galen's teaching that pus was laudable was observed empirically for centuries with undoubtedly a tremendous toll of life and, in addition, prolongation of convalescence and resulting deformity Even today the laity and many physicians believe that wounds must be actively treated and disregard the fact that resistance of the individual is of most importance. Until relatively recently the almost universally accepted opinion that pre-operative catharsis was not only desirable but also imperative for satisfactory postoperative convalescence of a patient was never disputed, largely because each student of medicine was told by his preceptor that such preparation was necessary. At the present time because of the observation that following emergency operations prior to which catharsis is not justified the postoperative convalescence is smoother and there is less depression of the intestinal activity, clinicians have been convinced that pre-operative catharsis is not only unnecessary but in the majority of instances is actually harmful Although there are few, if any, surgeons who advocate pre-operative catharsis (except in

certain cases), there are many who believe that gas pains, abdominal distention, nausea, and vomiting should follow every laparotomy and that an absence of these distressing symptoms during the postoperative convalescence is the exception rather than the rule Unquestionably many patients will continue to have abdomi nal distention, postoperative pain, and nausea if treated along empiric lines after operation If, however, the physician will admit that the patient's gastro intestinal tract following a laparotomy is functionally inactive due to stimulation of the splanchnics and if during this period the gastro intestinal tract is treated as any other portion of the body which is inactive, these undesirable metalaparotomy symp toms can be entirely obviated Sweetened drinks are administered after operation empirically by the majority of physicians, be cause presumably the carbohydrate is readily available and best tolerated. The ingestion of sweetened drinks by a patient whose gastro intestinal tract is functionally mactive as a result of a physiologic ileus is one of the surest ways of prolonging the ileus, because, as shown by Fine, the readily available carbohydrate is easily fermented and causes increased distention of the bowel, which in turn causes in creased secretion Although the majority of physicians will prescribe fruit juices and other sweetened drinks to patients who have been recently operated upon and believe that they are employing the best form of therapy, they more frequently than not observe that follow ing the ingestion of sweetened drinks abdomi nal distention is aggravated. Yet, rarely does this observation prevent the ordering of sweetened drinks for their next patient, because for years these drinks bave been used empirically during convalescence from operations Simi larly, a patient who has abdominal distention and complains of gas pains is frequently treated by the administration of enemas and flushes. It is irrational to assume that the gastro intestinal tract which is functionally mactive and already unable to empty itself of its contained fluid and gas will function nor mally after further overloading it by the administration of additional fluid in the form of an enema. Everything else being equal, the degree, the extent, and the duration of post operative distention and gas pains are directly proportionate to the number and the size of the enemas and the flushes administered, and yet how many physicians will allow a patient to go i 2, or even 4 days without having a bowel evacuation because the necessity of daily evacuation has been empirically used

Fortunately, because of the physiologic conception of disease and the rational therapy of pathologic conditions based upon physiologic principles, empirical treatment of disease at the present time is becoming less frequently used than previously, and, although many methods must still be used empirically, time will ultimately come when empiricism will become less frequently necessary.

ALTON OCHSNER

THE PASSING OF ENTEROS-TOMIES

JUST when the operation of enterostomy was first practiced on man is not known.

Lautre says that it was by Herdenham in 1897. The procedure reached its maximum populantly in this country a few years ago, many surgeons being enthusiastic while others have found it of questionable value. Its object has been principally for drainage of the intestine in cases of ileus, either mechanical or adynamic, and less often for the protection of intestinal suture lines from undue strain by gaseous distintion.

"It was pract ced upon horses and cows many centuries ago and as in many some survived it

Dramage of the intestine has been greatly desired because of the assumption that death from ileus resulted from the absorption of toxic products from the contents of the bowel, though just what these products are has not been determined by the many searchers The belief in such absorption has obsessed the human race for many centuries, and the surgeon has continued this erroneous idea into his practice On the other hand, investigation has shown that there is little absorption of toxic products from the bowel, obstructed or otherwise, and particularly is this true if its wall is in a healthy condition. But in spite of the widely known fact that patients with low obstruction survive longer than those with high obstruction, though necessarily having greater intestinal area for absorption, this idea of absorption of toxic products still persists

The most consistent and significant findings in cases of prolonged ileus, dynamic, adynamic, or paralytic, are loss of fluids, lowering of blood chlorides, increase of potassium and non protein nitrogen and an increase in the combining power of carbon dioude in the blood. One or more of these may be the fatal factor. Secondarily, there may be absorption of toxic products from the intestine when injury to its wall has resulted from impairment of its circulation which results from distention. Accompanying the impairment of the circulation there is also a disturbance of the normal evchange of fluids and gases between the blood stream and the lumen of the bowel.

Since distention plays such an important part in ileus, the enterostomy should be primarily to relieve or prevent it rather than to remove torue fluids. Again, since intestinal gases play such an important part in ileus, their origin must be understood perience has shown that abdominal distention does not occur after operation if swallowed air is kept removed from the stomach Gases produced from putrefaction and digestive processes, contrary to the general belief are insignificant. On the other hand, swallowed air not only comprises probably 80 per cent or more of the intestinal gases, but of more importance is the fact that 70 per cent of air is nitrogen which is not absorbable. A sick patient suffering from nausca swallows more frequently and larger quantities of air than normal, and in a recumbent position eructation is difficult, which accounts for the rapid distention one often sees

Enterostomy depends upon peristalisis to be efficacious but the traumatism from the operation delays peristalisis. No doubt in certain cases enterostomy may result very favorably, but in extreme cases it only hastens the end

We are convinced that gastric suction, with few exceptional instances, will accomplish all that can be expected of an enterostomy Gascous distention can always be prevented if anticipated, and even after distention has occurred gases can be removed from practically theentire small intestine by suction. The ileocecal valve prevents return of colon contents, and in obstruction to the large bowel, enterostomy (colostomy) is still indicated. It is unnecessary to say that fluids and chlorides removed by suction must be replaced. With greater familiarity and efficiency in the use of gastric suction, the operation of enterostomy need rarely be resorted to

ALBERT O SINGLETON

MASTER SURGEONS OF AMERICA

ROBERT EMMETT FARR

OBERT EMMETT FARR was born in Montello, Wisconsin, in 1875, and received his early education in the schools of that state. He was graduated from Rush Medical School, Chicago, in 1900. He served as interne at St. Mary's Hospital, Minneapolis, in 1900-1901. During his interne ship he became intimately acquainted with Dr. James Dunin, one of the outstanding surgeons of this community at that time. Later he became associated with Dr. Dunin, and this association continued until terminated by the death of Dr. Dunin.

Dr Farr was married to Miss Mary Scallen of Minneapolis on April 29, 1902 One son was born to Dr and Mrs Farr The tragic death of this son while he was well along in medical school was a source of much grief to Dr Farr The death of Mrs Farr later added to this seemingly almost unbearable grief

Dr Farr was one of those rare individuals who devoted his entire time to the advancement of medicine and surgery. His mechanical tum of mind led him to devote much time to the development of special types of instruments and apparatus as well as special methods of performing operations that might aid in the simplification of surgery. There was no type of general surgery that he did not attempt, and no type that he did not do well

While his work in all branches of surgery was highly commendable, his special efforts in developing the practicable side of local anesthesia stand out as his greatest achievement. His work with local anesthesia, no doubt, had much to do with creating the spirit of change from the old system of anesthesia. Many men had used local anesthesia at various times, even before the time of Dr. Farr, but no one man ever put forth the eothusiastic effort to establish its use firmly, as did Dr Farr He had many ingenious devices, all his own, for the successful administration of local anesthetics His moving pictures of his technique, among the first of their kind, aroused interest at the various medical meetings throughout the country. While he brought out many practical points in the administration of local anesthetics, his method of establishing anterior splanchnic anesthesia was perhaps his greatest contribution. Anterior splanchnic anesthesia bad been done by many men previously, but no other method was so simple and practicable as that of Dr Farr Negative intra abdominal pressure was sought by many who attempted this form of anesthesia, but was accomplished by few other than Dr Farr Prominent medical men from various parts of this country and abroad visited his clinics, and usually left feeling they had profited by the visit





Dr Farr contributed considerable to medical literature, but his text book on *Practical Local Anesthesia* stands out as his most important contribution in the literary line

The Hennepin County and Minnesota State Medical Societies, as well as many others throughout the country, voted to recommend Dr Farr for the Nobel Prize for his outstanding work in local anesthesia

Although very much occupied with his practice, he was a regular attendant at all important medical meetings and took an active part in the development and organization of all things medical. Dr. Farr took an active part in establishing Minnesola Medicine, now the official journal of the State Medical Association. He served several years on its editing and publishing boards and was an important factor in bringing it to its present high standard.

He taught surgery at the University of Minnesota from 1902 to 1914, and at the Minneapolis General Hospital from 1906 to 1914 During this time he established himself as a real teacher of the sound principles of surgery

One side of Dr Farr's character was little known to those who were not in close association with him. He was generous to a fault. Seldom would be fail a friend in need. He was always ready to serve his friends professionally or financially if called upon to do so. His anniety to assist the younger men was demonstrated by the generous assistance he gave many of them financially during their time in school as well as during their time of establishing a practice, and although he was by no means a wealthy man, he actually spent considerable sums of money in assisting these younger men

The very unusual hypertrophic condition of his spine which developed comparatively early in his life occasioned him great discomfort and pain. Although he was still a young man, he was unable to carry on an active practice during the last 4 years of his life. Even with this seemingly insurmountable handicap, he continued to think and do things medical. During this time he completed the second edition of his book on Practical Local Anesthesia and wrote the chapter on local anesthesia for a popular system of surgery.

Dr Farr was past president of the Hennepin County Medical Society, a member of the Minnesota State Medical Association, the American Medical Association, the Minnesota Academy of Medicine, the Western Surgical Association, the American Association of Obstetrical, Gynecological and Abdominal Surgeons, and a Fellow of the American College of Surgeons

Dr Farr's death occurred on June 30, 1932, at Minneapolis

JAMES M HAYES

LANDMARKS IN SURGERY

THOMAS G MORTON AND MORTON'S METATARSALGIA

PHILIP LEWIN, M.D., FACS, Chicago, Illinois

THOMAS GEORGE MORTON was born in Philadelphia on August 8, 1835, the son of Dr Samuel G physician and scientist (ethnologist and author of Crania Americana Egyptiaca) and Rehecca Grellet Pearsall Morton He died at Cape May on May 20 1903 of cholera morbus studied first in the academic and then in the medical department of the University of Pennsylvania re ceiving his medical degree in 1856, with a thesis on cataract. He was resident physician to the Pennsyl vania Hospital in 18,7 and patholo

gist and curator to its Museum from 1860 to 1864 when he was elected one of the surgeons of the staff his connection with this hospital contin uedoverforty years Hewassurgeon to the Wills Eve Hospital 1850 to 1874 and founder and surgeon to the Orthopedic Hospital-later the Phil adelphia Orthopedic Hospital and Infirmary for Veryous Diseases— with Weir Vitchell co-operating to make it famous During the Civil War he served almost continuously as acting assistant surgeon

He was quick and bright always kindly and responsive and especially alive to his civic obligations and to the claims of the poor He was a notable figure in Philadelphia His life was one of unusual activity and he performed successfully all of the major operations which in that day established the claim to the title of

great surgeon He did general practice for three years before devoting his entire time to general surgery During the Civil War he was active in the military hospitals established in Philadelphia for the care of wounded soldiers. In 1864 he was elected surgeon to the Pennsylvania Hospital In 1867 he founded the Philadelphia Orthopædic Hospital and Infirmary for Veryous Diseases and was on its surgical staff until he died. He wrote extensively on mechanical as well as on ophthalmic and blood vessel surgery

From May 1862 to February 1865 Morton was a colleague of D H Agnew at the Yown Hospital Chestout Hill Philadelphia the largest army hos pital to the United States accommodating five thou sand patients. He also organized the army hospital at

From the Dinsion of Surgery Northwestern University edical School and the Orthopedic Services Cook County and Michael Reese Hospitals



Thomas George Morton 183,-1003 (From Imerican Medical Illus trated Dictionary courtess W B Saunders Co)

Twelfth and Buttonwood Streets, Philadelphia He was professor of clinical and operative surgery in the Philadelphia Polyclinic for Graduates and his clini cal lectures held at the Pennsylvania Hosnital were attended by thousands of students Morton devised a model hospital ward dressing carriage in 1866 which received a certificate of award by the United States Centennial Commission in 1876 a light truck for transferring patients in their heds from ward to choical amphitheater and an apparatus for meas uring inequality in the length of legs

In 1864 he ligated the common caroted for orbital angurism in 1866 he amoutated at the hip joint in 1867 he tied the subclavian between the scalens and ligated the left in ternal iliac arters in 1871 he cured a case of complete osseous anky losis of the knee hy excision in 1877 he removed a dracunculus from the human eye and excised the os cal cis-all successfully. He performed the first successful laparotomy for appendicitis with the removal of the appendix on April 27 1886 after losing a brother and then a son by this disease on both of whom he had urged in vain the attending surgeons

to operate " He first described the affection known as metatarsalgia or Morton's toe and devised the operation for its cure In the January 1876 issue of The American Journal of the Medical Sciences Morton published a paper

A Peculiar and Painful Affection of the entitled Fourth Metatarsal Phalangeal Articulation which he reported 12 cases of this disorder and de scribed the anatomic structures and their relations in the lesion which has since been recognized as a clinical entity and is called Morton's toe Morton's plantar neuralgia or Morton's metatarsalgia

He wrote

During the past few years I have had under my care a number of cases of a reculiar and painful affection of the foot which so far as I am aware has not been described. In these cases the pain has been localized in the fourth metatarsal phalangeal articulation in several instances it followed at once after an injury of the

Tr Coll Phys Phil 1887 Doctor Rugh mentions an epi-ode which occurred in 1500 or Sqt Morton was quite radical regarding the appendix Follow 1891 Morton was quite radical regarding the appendix Following the death of his two children very early in life from pen typhilis or intestigal aboves, which we later found to be appendicts he advocated the removal of the appendix in all children at the earliest possible age. foot in others it was gradually developed from pressure while in others there was no recognized cause

In a report covering the histories and treatment of

From the number of cases which have been observed it would appear that the affection is not so uncommon only that as a distinct disease at has not heretofore been noticed. Of the 12 cases which I have reported 11 have occurred in females Besides these I have had 3 other cases making a total of 15 the neuralgain 18 of the cases was clearly traced to a direct injury to a joint of the fourth toe in 3 or 4 cases it originated from show pressure and in the remainder no cause for the pain was assigned. The neuralgor porovysms and subsequent sensitive conditions of the cases were also as the case it is and it is a severe inflammatory symptoms were not observed in any of the cases in several instances where this neuralga followed an injury a rupture of the ligaments or parts about the joint of the fourth metatarsal has supposed to have occurred.

Motton ascribed the neuralgia to the peculiar position which the fourth metatarsal phalangeal articulation bears to that of the fifth, the great mobility of the fifth metatarsal, which by lateral pressure is brought into contact with the fourth, and lastly, the proumity of the digital branches of the external plantar nerve which are, under certain circumstances, likely to be bruised by, or pinched between, the fourth and fifth metatarsals. He attributed the great incidence in females not only to the great delicacy and plability of the female foot as compared with the male foot, but perhaps in a measure to the prevailing custom, especially with fashionable women, of wearing tight and very narrow shoes. The fifth metatarsal is thus pressed against the head and neck of the fourth. The toes generally

are irregularly crowded together and a painful condition of the foot may be induced and this, kept up, undoubtedly predisposes to more serious consequences

In cases in which this form of neuraliza has been suddenly induced by an injury the treatment should be vigorous local flower of the properties of the properties of the continuous energy of the properties of the properties of the properties of cases such as have been described no other treatment except complete exists on of the irrathile metatrasophalangeal joint with the surrounding soft parts will be likely to prove permanently successful

Morton tried to explain the mechanism of production of this condition and reproduced an illustration showing the plantar nerve with the digital branches of the external plantar to the fourth and fifth metatarsophalangeal articulations with the deeper branches to the same region

Morton recommended in some cases a deep excavation corresponding with the joint of the fourth toe, in the sole of a broad shoe. It is interesting that one of his patients carried a vial of chloroform at all times as the only application which ever relieved her, and that was beginning to lose its effect.

In one case Morton said

In this case it would appear that the neuralga was in the first place caused by a sudden mal position of the metatarsophalangeal joint to the fourth toe incident either to a relaxed state of the none of to a partial ripture of the lagaments which allowed the head of the bone to slip from its phalangeal articulation thus subjecting the part to unusual pressure

I am indehted to Dr J Torrance Rugh Professor of Ortho pe he Surgery Jefferson Medical College Philadelphia for con siderable personal data concerning Dr Morton and wish to express herein my thanks

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

IN a volume of some 850 pages Paul Titus presents his study of the Management of Obstetric

Difficulties: The subject matter is divided into eight sections as follows sternliv difficulties in diagnosis of pregnancy, complications of pregnancy, complications of pregnancy, complications of labor obstetic operations complications of the purperium the newborn infant and a final section on general subjects such as preparation for operation analgesia etc. There are 314 well cho en illustrations.

Section I is devoted to sterility and the subject is presented in a complete clear manner. In addition to discus ing the work and methods of others on this subject. Dr. Titus gives a resume of his own works with statistics and presents a finale of precautions.

in diagno is and prognosis

Section II deals with the diagnosts of pregnance and the difficulties in diagnosts and in determining its duration. The usual methods employed are

dı cu-sed

Section III treats of the complications of pregnancy and the major difficulties encountered during pregnancy each subject being treated according to its importance ectopic pregnancy, placents prævia ablatio placentæ and toremus each is duly considered and the treatment of each is discussed in a

most thorough manner

Section IV treats of the complications of labor of total due to abnormalities of the uterine contractile forces developmental anomalies and gaseco ingical abnormalities with suggestions for the man agement of labor in all these conditions. Titus gives the (various) methods of pelicy mensuration and the means of determining the presence of a continuation of the means of determining the presence of a continuation of the cont

The cause and treatment of intrapartum and post partum hemorrhage are minutely dealt with and the value of transfusion and uterine tamponade are stressed. The prevention of injuries to the birth canal and the care of such injuries when they do on the care are proposed.

cur are graphically described by word and pictures. In the ection on operative obstetries the indications for various procedures are clearly set forth with pictures of the operative technique visualization of the various procedures by drawings or photographs is a most important feature since the

THE MANAGEMENT OF CONSTRUCT DIFFICULTIES By Paul Titus M D
St Louis The C V Mosby Co 1947

book is obviously intended for the student of obstetines. An excellent excution on the newborn infaint stresses the treatment of asphyria. If the manage ment of this condition as outlined by Thus were generally followed there would be a marked reduction in fetal mortality. The remainder of the book is desorted to the preparation for obstetrical operation postoperative rare, analgesia and anesthesia and the technique of intravenous injections par tendarly destroys solutions and blood solutions

Titus quotes freely from other sources. If there are diversified opinions concerning the management of a given condition bowever, be unhesitatingly states his views and gives his reasons for following.

ans one procedure

This volume will be most valuable as a ready reference for the student of obstetrics and deserves a place in the obstetrician's library

CRESTER C DORESTY

B's experimental and clinical study. Jona of Mel bourne has endeay ord to elucidate come of the more obscure eutological phases of renal pain. In his book Kathay, Point-the anatomy physiology and pathology of the lidney, pelves, calt ces and ureter are briefly reviewed. Py eloscopy with an individual catheter has given some interesting observations. Pelometri studies were carried out on aneithetized dogs and in human beings in conjunction with py eloscopy and py elography, the entire interesting observations are presented out of the present of the present

Clinical reports illustrating cases of renal pain due to distortion of rhythmical calpione purior and uneteral contractions are pre-ented. Associated pathological abdominal conditions (appendictis gall bladder disease) as the extring factors in a few cases of renal dysfunction are exceedingly interest.

cases of read dysametons are extending interesting in The case of antiperstal is in which pyelography of the left kidney, receded antiperstal is and regurgation of the fluid in the right read pelvis was well illustrated. On the other hand some eribte may be offered as was mentioned the value of pyeloscopy and pyelometry in the presence of a large uneteral catheter may well be questioned. The normal pelvie capacity of the kidney as to cube centimeters seems too high. The word infundible centimeters seems too high. The word infundible

*Kinner Pars Its Causarion and Treatment By J Leon J na D Sc (Adel) M D (Melb) M S (Adel) F R.A.C.S M COG London J & A Churchill Ltd 1957 ulum" is invariably erroneously used to designate the renal pelvis Recommending a nephrectomy only on the basis of a non contracting calyx would seem inconclusive evidence except in rare instances Citing a septic case of pyelitis cured by an injection of 1 cubic centimeter of pituitrin should be ques tioned because a catheter was simultaneously passed The passage of a ureteral catbeter alone has cured many cases of febrile pyelitis While the study and effect of drugs on the renal pelvis and ureter represent an enormous amount of work, the results are not entirely convincing A slight amount of imagination must be added to interpret all the described favorable influences

This treatise is valuable in so far that it should stimulate further investigative work in this par ticular field The author is to be commended for giving credit to other investigators who bave con tributed toward the many phases of this so exceed ingly interesting study, namely normal physiology and pathology of the renal pelvis and ureter

L W RIBA

JEVER again do I expect to have the responsi-bility of reviewing so important a book as Dr Miller's The Lung 1 To those who for many years have hoped that it would be written, and these in clude all who have been in any way interested in the structure of the lung it needs no recommendation Over a period of nearly 50 years, the name of William Snow Miller has become synonymous with pulmo nary anatomy and with a type of painstaking histo logical research by which alone the finer structure of an organ can be discovered and which few have the devotion and genius to carry out Dr Miller's first paper on the lung was published in 1802 while he was working in the laboratory of Dr P P Mall at Clark College in Worcester, Massachusetts From that time until the present, in Germany under Wer ner Spalteboltz and for the past 45 years as professor of histology at the University of Wisconsin, he has worked steadily on the same subject and so success fully that he has discovered much that is new and on nearly every disputed point has contributed determining information. Now at the age of 70, he has summarized the results of his studies in this book. It is the history of the development of knowl edge concerning the lung and an extremely lucid statement of its present status. It is a record of a unique achievement, of a life singularly devoted to the search for truth, and of an intelligence and temperament singularly adapted to scientific work It places its author in the class of Vesalius, Fallopius, Willis, and the other great anatomists. It is not a small thing to have advanced knowledge so far in a field where discovery is so difficult Dr Miller's life and work should be an inspiration to all students of medicine and a criticism of any who may think any pbase of it dull or well known

Dr Miller has been more than a great scientist In the lecture room, in the laboratory, and, particularly, in his library at the gathering of the medical history club, he has succeeded in transmitting to his students a regard for the high traditions of science and medicine, in imbuing them with the same enthusiasm which he in turn must have received from Mall and of which he has been so good a guardian His consideration for this phase of his function accounts for his chief idiosyncrasy as a teacher From each class he selected a small group of the more promising students. He saw that the rest learned what was necessary, these he encouraged and cultivated and on most of them has left his mark Were his contributions to knowledge not a lasting monument to him, the men whom be has trained and in fluenced would suffice IEROME R HEAD

"HE second edition of White's Heart Disease" has been predicated upon the popular reception of the first edition The author has been an active contributor to cardiac literature for some years and is probably America's leading cardiologist. His extensive clinical experience clearly justifies publication of this text

The author has succeeded splendidly in the diffi cult task of presenting the voluminous material covering the field of beart disease in a volume of this size The subject matter is informative, well presented and accurate according to present standards of opinion The bibliography is particularly well chosen

The chapters on "rheumatic" beart disease, pulmonary heart disease, and coronary heart disease are especially well presented. The sections on heat in thy roid disease, especially hypertension, and syphilitic heart disease are not of the same standard section on disorders of cardiac function contain excellent material on angina pectoris and auricular fibrillation One might question the division of space allotted to certain types of cardiac disease Con genital heart disease, of rare occurrence, has been allotted 45 pages while syphilitic heart disease is discussed in a chapter of 12 pages The student and practitioner may complain of Dr White's frank statement of fact regarding the inadequacy of treatment in many cases The author has added a well organ ized appendix on historical data regarding heart dis ease and the nomenclature of the American Heart Association for diagnosis, which he originally devised Both of these constitute valuable additions

The book is somewhat carelessly bound and printed The type is well selected and the cuts of roentgenograms, electrocardiograms, and pathologi

cal specimens are well reproduced

The book will be generally appreciated and it will undoubtedly rank as the best general text of heart disease on the American market today

C C MARIER

"THE LUNG By William Snow Miller Springfield III. and Baltimore Md. Charles C. Thomas 1937 HEART DISPASE By Paul Dudley White M D 2d ed New York The Macmillan Co 1937

BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender Selections will be made for review in the interests of our readers and as space nermits

THE TECHNIC OF LOCAL ANESTHESIA By Arthur E Hertzler AM MD PhD LLD, FACS 6th ed.

St Louis The C V Mosby Co 1937

PRACTICAL ENDOCRINOLOGY SYMPTOMS AND TREAT MENT By Max A Gold.ieher M D ad ed New York and London D Appleton Certury Co Inc 1937

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By Dr Martin Kirschner With the collaboration of A

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Ohlsson, 1937

SYNOPSIS OF GENECOLOGY BASED ON THE TEXTBOOK DISEASES OF WOMEN By Harry Sturgeon Crossen M D FACS and Robert James Crassen MD ded. St. Louis The C V Mosby Co 1937

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AND GENERAL PRACTITIONERS By Charles H May M D 15th ed. rev with the assistance of Charles A Perera M D Baltimore William Wood & Co 1937

ROSE AND CARLESS VANUAL OF SCREEN America 15th ed Edited by William T Coughin BS MD FACS From the 15th English ed b Ceul P G Wakeley DSc (Lond) FRCS (Eng) FRS (Edm) and John B Hunter MC W Chir (Lantab) FRCS (Eng) Baltumore William Wood & Co. 1937

DISEASES OF THE YERLOUS SYSTEM IN INFANCY CHILD-BOOD AND ADDIESCENCE By Frank R Ford, M D Springheld III and Baltimore \text{\text{fd}} Charles C Thomas

1037

SCRITTI DE CHIRURGIA ERNIARIA PER COMMEMORARE IL CINQUANTENARIO DELLA OPERAZIONE DI BASSINI VOIS I and a Compiled by G M Fasiani and A Catterina

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ATLAS OF HEMATOLOGY By Edwin E Orgood M.A M D and Clarace M Ashworth San Francisco J W Stacey Inc 1937

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

EUGENE H POOL, New York, President FREDERIC A BESLEY, Waukegan, President Elect VERNON C DAVID, Chairman, Michael L Mason, Secretary, Committee on Arrangements

PROGRAM FOR THE 1937 CLINICAL CONGRESS IN CHICAGO

OR the twenty-seventh annual Clinical Congress of the American College of Surgeons to be held in Chicago, October 25-29, the surgeons of Chicago, under the leadership of a representative committee, will provide a program of chinics and demonstrations that will present a complete showing of the clinical activities in all departments of surgery in this great medical center. The committee is assured of the hearty co-operation of the clinicans at the five medical schools and more than fifty hospitals that will participate in the clinical program.

There appears in the following pages a preliminary schedule of the operative clinics and demonstrations as prepared by the committee Published in tentative form at this time the clinical program is to be revised and amplified during the months preceding the Congress Chinics will be arranged for the atternoon of Monday, October 25, and for the mornings and afternoons of

each of the four following days

It will be noted that in addition to an ample and well arranged schedule of operative clinics demonstrating the technique of a wide variety of surgical procedures, the committee has arranged ? series of demonstration clinics at the medical schools and in the larger hospitals where the work being done in many special fields will be presented, including neurosurgery, traumatic surgery, thoracic surgery, plastic surgery, fractures, cancer, orthopedics, gynecology and obstetrics, gento-urinary surgery, experimental surgery, physical therapy, roentgenology, ophthalmology, otolaryngology, etc.

The committee has undertaken to so correlate the programs of the participating institutions as to provide the visiting surgeon an opportunity to devote his time continuously, if he so wishes, to climcs dealing particularly with the special subjects in which he is most interested. Thus, it is planned to arrange so that fracture clinics or cancer chines, for example, will be available each morning and afternoon during the Congress.

The showing of surgical motion picture films, which so faithfully depict clinical features of major interest to most surgeons, will be continued at this year's session with an enlarged program of both sound and silent pictures with daily exhibitions at headquarters.

EVENING SCIENTIFIC MEETINGS

Programs for a senes of evening meetings, as prepared by the Executive Committee of the Board of Regents, appear in the following pages At the opening session on Monday evening—the presidential meeting and convocation—in the ball-room of the Stevens Hotel, Dr Vernon C David, Chairman of the Committee on Arrangements, will deliver the address of welcome, following which a number of distinguished foreign guests will be introduced

The retiring president, Dr. Eugene H. Pool, of New York, will deliver the presidential address which will be followed by the inauguration of the new officers Dr. Frederic A. Beslev, of Waukegan, president, Dr. Frank W. Lynch, of San Francisco, and Dr. Austin B. Schinbein, of Vancouver, vice-presidents. The 1937 class of initiates will be received into fellowship in the College at this session. A feature of this evening's program will be the annual College oration on surgery to be delivered by J. P. Lockhart-Mummery, M. B., B. Ch., F. R. C. S., of London, England.

Papers on surgical subjects of present day importance will be presented by eminent surgeons of the United States and Canada at sessions in the grand ballroom on Tuesday, Wednes-

day and Thursday evenings

On Tuesday and Thursday evenings, in the north ballroom of the Stevens Hotel, eminent surgeons who specialize in the fields of ophthalmology and otolaryngology will present and discuss papers of interest to those whose work is limited to these particular fields. A detailed program for these two sessions will be published in the next issue.

AFTERNOON SESSIONS

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Cancer—graduate training for surgery—ob stetries and gynecology—industrial medicine and traumatic surgery—fractures provide the subjects for five afternoon conferences

The cancer symposium on Tuesday afternoon, the program for which appears on a succeeding page, will cover a wide field of experience and research Papers to be presented will discuss types of malignant growths that occur in various organs and glands and will give the results of different kinds of treatment or combination treat ment by surgery, radium and \(\ta \) Of particular practical interest will be the presentation by three Philadelphia surgeons of their clinical observations of response to methods of refrigera tion in metastatic carcinoma, which wilf show the correlation of body segmental temperature to this condition. At the conclusion of the ses sion Dr Bowman C Crowell head of the De partment of Clinical Research, will present fig ures on five year cures of cancer Three years ago the College reported 24,440 five year cures recorded up to that time

A conference on graduate training for surgery on Wednesday afternoon (see program in the fol lowing pages) is designed to emphasize the im portance of more extensive and thorough practice of surgery under supervision before a surgeon em barks upon a more independent career All Fel lows of the College, interested as they are in elevating the standards of their profession and in protecting the public from incompetent practi tioners will want to hear the views of the various speakers on how to provide more opportunities for graduate study and why such study should be encouraged. These views will be presented in a panel discussion in which representatives of various surgical groups will participate Preced ing the discussion a special field representative of the College will present findings from a 1037 survey of opportunities for graduate training provided in hospitals

A symposium on obstetrics and gynecology will be held on the same afternoon Wechnesday (Program on succeeding page) Not only the specialist in this field but the general surgeon as well, will find the subject matter to be covered in this session of interest.

A conference on industrial medicane and train matic surgery on Thursday afternoon (see program) will include discussion of many subjects of interest to practitioners outside as well as those in the industrial field, since injuries re sulting from accidents in the home, on the ath lette field, and on the highways are often similar in nature to those which are sustained in in dustrial accidents. New methods of management which have had beneficial results will be described. The Committee on Industrial Medicine and Traumatic Surgery will present the findings of the 1936-1937 surveys and will outline the general trend of medical service as provided by industry.

A 5 mposium on fractures will be beld on Frida's aftermoon (program appears on a suc ceeding page) Fractures occur so often in in dustrial accidents that the papers to be presented at this session will have almost equal in terest to those of the preceding day for the industrial surgeon Perhaps in no field of surgery have the results of improved procedures been more exident. The same types of fractures which with methods used a few years ago would have involved serious permanent disablement can now often be managed in such fashion that little or no disability results, and still better practices are constantly being evolved. Some of these will be described at the conference

Handling of fractures and other traumatic sur gers of vanous kinds will be demonstrated at Chicago hospitals during the week of the Congress On display in connection with the scientific exhibition at the headquarters will also be apparatus and instruments for use in traumatic surgers.

HOSPITAL CONFERENCE

Stressing those elements in hospital service which contribute most to the best possible care of the patient, the program for the twentieth annual hospital standardization conference (see detailed program in the following pages) prevents opportunity for discussion of most of the important problems of hospital operation

The regular sessions of the conference will be held at the Stevens Hotel every morning from Monday until Thursday, and the afternoons of the same days except Wednesday when demon strations will be given in a number of Chicago hospitab.

At the opening session on Monday morning, Dr. Eugene H. Pool president of the American College of Surgeons, will deliver an address, which will be followed by the report of the 1937 survey of hospitals and official announcement of the approved first by Dr. George Crile, Chairman of the Board of Regents. At the same session four important talks on the various obligations of the hospital personality and psychology in the hospital psychology in the hosp

The entire session Monday afternoon will be devoted to the medical staff conference, with consideration of how, when and where to hold it, the proper attitude toward it, and the results that may be expected A feature of the program will be a model staff conference staged by the medical staff of the Ravenswood Hospital

Organization, direction, control, and functioning of the clinical departments of the hospital will be considered at the Tuesday morning session, and the management of hospital personnel will be discussed from various viewpoints on

Tuesday afternoon

In view of the obvious desirability of considering more deeply the public relations of hospitals, an entire session on Tuesday evening will be devoted to discussion of this problem. This will be a joint session with the Chicago Hospital Council and the Chicago Hospital Association. Charles H. Schweppe, president of the former body, will preside. Talks are scheduled on how best to cooperate with the press in the handling of news involving hospitals, and how hospital administrators, hospital trustees, and members of the staff may aid in improving relations with the public.

Record librarians, whose behind the scenes ac truttes furnish the basis for much of the progress in procedures in caring for the patient, will unite through their organization, the Association of Record Librarians of North America, with the hospital standardization conference in a joint session on Wednesday morning. How to evaluate medical records, how to develop a medical record consciousness in the hospital, the remunerative value of good records, and other phases of record keeping will be discussed. The Medical Record Librarians of Chicago will furnish a graphic illustration of how to co operate in their activities in the hospital by presenting a sketch, "The Medical Record Librarians activities in the Medical Record Librarians of Communication of the second Librarians of The Medical Record Librarians of The Medical Record Librarians of Communication of the Medical Record Libraria

Co-operating with the conference, system Chicago hospitals and the University of Chicago Chines will hold demonstrations on Wednesday afternoon of many phases of hospital operation, from the organization and maintenance of a psychiatric department to the handling of laun dry Selection of the demonstrations which delegates wish to attend should be mide at the time

of registering

The Thursday sessions will be conducted as panel round table conferences. Discussion on the various topics will be led by experts in each field. The general theme will be hospital administration and standardization problems. Business methods, call systems, nursing service, social

service, air conditioning, income and technical service standards will be discussed at the morning session, standardization of furnishings, equipment and supplies, food service, professional problems of the small hospital, and other topics will be discussed at the afternoon session

Hospitals in Chicago and vicinity will welcome visits by delegates to the conference and opportunity for such visits will be given on Friday Information should be obtained at the head quarters for hospital registration and informa-

tion at the Congress

HEADQUARTERS AND TECHNICAL EXHIBITION

Headquarters for the Congress will be estabhished at the Stevens Hotel where the grand ballroom with its large foyers and other meetingrooms on the second and third floors have been reserved for scientific sessions and conferences

The Technical Exhibition will be located in the Exhibition Hall in which will be placed the registration and clinic ticket bureaus and the bulletin boards on which the daily clinical program will be posted each afternoon for the following day Leading manufacturers of surgical instruments, is ray apparatus, operating room lights, hospital apparatus and supplies of all kinds, ligatures, dressings, pharmaceuticals and publishers of medical books will be represented

ADVANCE REGISTRATION

The hospitals and medical schools of Chicago afford accommodations for a large number of visiting surgeons, but to insure against overcrowding, attendance at the Congress will be definitely limited to a number that can be comfortably accommodated at the clinics, the limit of attendance being based upon the result of a survey of the amphitheaters, operating rooms, and laboratories of the hospitals and medical schools to determine their capacity for visitors. Therefore, those surgeons who wish to attend the Congress are expected to register in advance

A registration fee of \$5 co is required of each surgion attending the annual Chincal Congress, such fees providing the funds with which to meet the expenses of the meeting. To each surgeon registering in advance a formal receipt for the registration fee is issued, which receipt is to be exchanged for a general admission card upon his registration at headquarters. This card, which is non-transferable, must be presented to secure, chime tackets and admission to evening meetings.

Admittance to clinics and demonstrations will be controlled by means of special clinic tickets, the number of tickets issued for any clinic being limited to the capacity of the room in which that clinic is given. This plan provides an efficient means for the distribution of the visiting surgeons among the several clinics and insures against overcrowding

RAILWAY RATES

Although no special rates have been authorized by the railways for the Clinical Congress in Chi cago this year, and certificates will not be required the railways in the western, northwestern, southwestern, and southeastern states will offer for sale in October round trip tickets to Chicago at very low rates, with a 30-day return hmit in certain territory and a 15 day return limit in other territory Complete information as to rates, routes, and stop-over privileges may be obtained from local ticket offices. In the territory east of Chicago, north of the Ohio and Potomac Rivers including the north Atlantic and New England states and eastern provinces of Canada the regu lar rate of three cents per mile in pullmans and two cents per mile in coaches will be in effect

CHICAGO HOTELS AND THEIR RATES

In addition to the headquarters hotel, the Ste vens, there are several first class hotels within short walking distance of headquarters, providing ample hotel facilities at reasonable rates. It is suggested that reservation of hotel accommoda tions be made at an early date. The following hotels are recommended by the Committee

The second secon		
	M numum Rate with Bath Single Double	
Auditorium 430 S Michigan Ave	\$2 50	\$4 ∞
Bismarck 171 W Randolph St	3 50	5 00
Blackstone Michigan Ave at 7th St	4 00	6 ∞
Congress 500 5 Michigan Ave	3 00	5 00
Drake Michigan and Lake Shore Drive	4 00	6 ∞
Great Northern 237 S Dearborn St	2 50	4 00
Harrison 57 L Harrison St	2 50	3 50
Knickerbocker 163 E. Walton Pl	3 00	5 00
LaSalle so N LaSalle St	3 00	4 50
Morrison 70 W Madison St	3 00	4 00
Palmer House 15 E Monroe St	3 50	5 00
Sherman 106 W Randolph St	2 50	400
Stevens 720 S Michigan Ave	3 00	4 50

PROGRAMS FOR AFTERNOON SESSIONS

SYMPOSIUM ON CANCER

Tuesday 2 00 P M -ballroom Stevens Hotel

CHARLES A DUKES M D Oakland Chairman of Committee on the Treatment of Malignant Diseases pre<iding

Correlation of Body Segmental Temperature and Its Relation to Metastatic Carcinoma Chinical Observa tions and Response to Methods of Refrigeration TEMPLE FAY, M D , GEORGE HENN M D , and AUCUSTUS McCRAVEY M D Philadelphia

Topic to be announced J P LOCKHART MUMMERY MB BCh FRCS London Paget's Disease of the Aipple SIR GEORGE LEYTHAL CHEATLE FRCS, London

Cancer of Fsophagus John H Garlock MD New York

Carcinoma of Thyroid HAROLD L Foss M.D. Danville Pa

The Role of Cystectomy in Mahinant Tumors of the Bladder Charles C Higgins M D Cleveland Presentation of Five Year Cures BOWMAN C CROWELLEM D, Chicago

OBSTETRICAL AND GYNECOLOGICAL CONFERENCE

II ednesday, 2 00 P M -North Ballroom, Stevens Hotel

FRANK W LYNCH, M D , San Francisco, Vice President, American College of Surgeons presiding Conservatism in Obstetrics George W Kosman, M.D. New York

Water Balance in Relation to Tovemias of Pregnancy M EDWARD DAVIS, M D , Chicago

Abdominal and Pelvic Pain from the Gynecological Viewpoint ARTHUR H CURTIS, M D, Chicago Cesarean Section JOHN R FRASER, M.D., Montreal

Differential Diagnosis in Intestinal, Umpary and Gynecological Diseases FLOYD E KEENE, M.D. Philadelphia

Syphilis in the Pregnant Woman JAMES R McCORD, M D, Atlanta

CONFERENCE ON GRADUATE TRAINING FOR SURGERY

Wednesday, 2 oo P M -Ballroom, Sterens Hotel

Frederic A Besley, M D, Waukegan, III, President, American College of Surgeons, presiding Opening Remarks George Crile, M.D., Cleveland, Chairman, Board of Regents, American College of Surgeons

Purpose of Conference MALCOLM T MACEACHERN, M.D., Chicago, Associate Director, American College of Surgeons

Graduate Training for Surgery ALTON OCHSNER, M.D., New Orleans

Findings from the 1937 Survey of Hospitals by the American College of Surgeons MELVILLE H MANSON, M D, Minneapolis, Special Field Representative

Panel discussion from the following viewpoints

The Surgeon in the Teaching Hospital Dallas B Phemister, M D , Chicago The Surgeon in the Large Non Teaching Hospital DONALD GUTTIRIE, M.D., Sayre, Pa The Surgeon in the Rural Community Hospital Howard L Snyder, M D . Winfield, Kan The American Surgical Association Eugene H Pool, MD, New York The American Board of Surgery EVARTS A GRAHAM, M D , St Louis The American Medical Association FRED W RANKIN, M.D., Lexington, Ky Significant Experiences in the Training of Surgeons on a Graduate School Basis Louis B Wilson.

M D . Rochester, Minn Discussion Otolaryngology-Perry G Goldsmith, M D, Toronto, Urology-Frank Hinman, M D, San Francisco, Gynecology and Obstetrics-Artifur H Curtis, M D, Chicago

SYMPOSIUM ON INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY

Thursday, 3 00 P M -Ballroom, Stevens Hole!

Frederic A Besley, M D, Waukegan, Ill, Chairman of Committee on Industrial Medicine and Traumatic burgery, presiding

Recognition and Prevention of Lead Poisoning ROBERT ARTHUR KEHOE, M.D., Cincinnati Reconstruction Surgery of the Face and Jaws DR MED WOLFGAMG ROSENTHAL, Leinzig Injuries of the Chest and Abdomen EDMUND BUTLER, M.D., San Francisco The Modern Concept of the Industrial Medical Problem M N Newoust, M D . Chicago Reconstruction of Scalp and Ear by Tube Graft Method JAMES A CAHILL, JR, MD, Washington, DC Physical Therapy in Relation to Industrial Surgery Kristian G Hansson, M.D. New York

SYMPOSIUM ON FRACTURES

Friday, 2 oo P M -Ballroom, Stevens Hotel

FREDERIC W BAYCROFT, M D. New York, Chairman of Committee on Fractures, presiding Organization of Regional Fracture Groups CHARLES L SCUDDER, M.D. Boston Functional Disabilities after Simple Fracture FRASEP B Gund, M.D., Montreal Fractures of the Shaft of the Humerus J HUBER WAGNER, M D , Pittsburgh Fractures of the Bones of the Hand HUBLEY R OWEN, M.D. Philadelphia Malumon in Fractures Willis C CAMPBELL, M D , Memphis, Tenn Fracture of Both Bones of the Forearm (excluding Colles' Fracture and Fractures into the Elbow Joint)

WILLIAM B CARRELL, M D , Dallas, Texas

PROGRAMS FOR EVENING MEETINGS

Presidential Meeting and Convocation-Monday, 8 oo P M -Ballroom, Stevens Hotel

Address of Welcome Vernox C David M D. Chicago, Chairman, Committee on Arrangements Introduction of Foreign Guests

Address of the Retiring President Eugene H Pool, M D , New York

Inauguration of Officers

Conferring of Fellowships Frederic A Besley, M.D., Waukegan, Ill President

Conferring of Honorary Fellowships The President

Annual Oration on Surgery The Surgeon as a Biologist J P LOCKHART MUMMERY, M B, B Ch. FRCS, London, England

Tuesday, 8 00 P W - Ballroom Stevens Hotel

Treatment of Peptic Ulcer

Indications for Surgery JAMES H MEANS, M.D. Boston Technique of Surgical Treatment ROSCOE R GRAHAM M.D. Toronto

Nucleus Pulposus and Lower Back and Sciatic Pains Howard C NAFFZIGER M D . San Francisco The Relation of Chronic Cystic Mastitis to Cancer of the Breast Dean Lewis, M.D., Baltimore

Il ednesday, 8 oo P M -Ballroom, Stevens Hotel

Lymphedema

The Genesis and Con equences of Lymphedema Cectl k Drinker, M.D., Boston Circulatory and Lymphatic Disturbances in the Abdomen Willis D. Garcii M.D., Indianapolis

Diverticula of the Intestine CLAUDE F DIXON M D Rochester, Minn

Immediate or Delayed Treatment of Acute Cholecystitis (Liver Shock and Death) HENRY W. CAVE M D . New York

Thursday, 8 oo P M -Ballroom, Stevens Hotel

Tuberculosis of the Kidney FRANK HINMAN M D , San Francisco

Physiological and Pathological Changes in the Urinary Tract during Pregnancy J Mason Ht DLEY JR , M D , Baltimore

Acute Pancreatitis IRVIN ABELL M D Louisville

Fracture Oration The Present Status of the Operative Treatment of Fractures William O Neill SHERMAN, M D . Pittsburgh

Community Health Meeting-Friday, 8 oo P M -Ballroom Stevens Hotel

Program in preparation

ANNUAL HOSPITAL STANDARDIZATION CONFERENCE

Morday 10 00-Ballroom Stevens Hotel ELGENE H POOL M D New York I resident American College of Surgeons presiding

President s Address Report of the 1937 Survey of Hospitals and Official An nouncement of the Approved List Gronce Came M D Cleveland Chairman Board of Regents Ameri

can College of Surgeons The Approved Hospital and Its Obligation—Diagnosis and Therapy Education Prevention and Research BERT W. CALDWELL M.D. Chicago

Personality and Psychology in the Hospital G Harvey

Trends in Medical Education JOHN H J UPRAM M D

Columbus Ohio Criteria to be Observed When Selecting Internes and

Residents James H Means M D Boston
The Effect Hospital Insurance Plans Are Having on
Medical and Hospital Services C Ruffle Rorem Ph D Chicago

Monday . 00-Bollroom Stevens Hotel GEORGE E WILSON MB Toronto Vice President American College of Surgeons presiding

The Medical Staff Conference—with Panel Discussion from the Following Viewpoints

General Presentation of Subject HAROLD L Foss, M D, Danville Pa

Proper Attitude of the Medical Staff JAMES T NIK. M D New Orleans Time, Place and Physical Essentials WILLIAM H WALSH,

M D , Chicago

Conduct of the Conference EDWARD I TUOHY, M D, Duluth Minn Criteria of a Good Medical Staff Conference FELIX P

MILLER, M D , El Paso, Texas Demonstration-A model medical staff conference by the medical staff of Ravenswood Hospital, Chicago

Tuesday, 10 00-Stevens Hotel

F Weldon Young, M.D., Seattle, Wash, presiding Clinical Departments of the Hospital, Embracing Organi

zation Direction Control, Functioning Oral Surgery and the Dental Department in the General Hospital William H G Logan, M D, Chicago

Psychiatric Department in the General Hospital Samuel

W HAMILTON, M D., New York
The Physical Therapy Department in Small, Medium and Large General Hospitals John S Courter, M.D.,

Chicago The Out patient Department in the General Hospital CHRISTOPHER G PARNALL, M D Rochester, N Y The Obstetrical Department in the General Hospital OTTO H SCHWARZ, M D , St Louis

Tuesday, 2 00-Stevens Hotel

FRED G CARTER, M D, Cincinnati, presiding Hospital Personnel Management-with Panel Discussion from Various Viewpoints

General presentation of subject FRANK I WALTER. Denver

Selection E MURIEL ANSCOMBE, RN, St Louis Physical Health HAROLD L SCAMMELL, M D, Halifax Assignment of Duties CLINTON F SMITH Chicago

Working and Living Conditions JOSEPH G NORBY, Milnaukee

Morale MACIE N KNAPP, R N, Normal, Ill Training and Education of Hospital Personnel George O'HANLON, M D , Jersey City, N]

Tuesday 8 00 P M -Stevens Hotel Joint Session-with Chicago Hospital Association and Chicago Hospital Council CHARLES H SCHWEPPE, Chi

cago, presiding Public Relations-with Panel Discussion from the Follow ing Viewpoints

General presentation of subject PERRY ADDLEMAN. Chicago

The Hospital Administrator ADA BELLE McCLEERY. R N , Evanston, Ill

The Member of the Medical Staff FREDERIC J COTTON, M D , Boston The Press HOWARD W BLAKESLEE, New York

Fund Raising PAUL E FESLER Chicago Community Good Will A EDWARD A HUDSON, Waynes boro, \a

Wednesday 10 00-Stevens Hotel

Joint Session with Association of Record Librarians of

North America R C BUERKI, M D , Madison, Wis , presiding

Developing a Medical Record Consciousness in the Hospital SISTER M PATRICIA, OSB, BS, RRL, Duluth, Minn

What Constitutes a Proper Appraisal of the Medical Record CHARLES B PUESTON, M D, Chicago, and LILIAN H ERICKSON, RRL, Milwaukee

Incomplete Medical Records - Causes and Remedies

ALICE G KIRLAND, R.R.L., Oakland, Calif
The Remunerative Value of Good Medical Records RICHARD B DAVIS, M D, Greensboro, N C

The Technique of Making Group Studies of Diseases THOMAS R PONTON, M.D., Chicago Sketch—The Medical Record Librarian's Dream Comes

True Presented by the Medical Record Librarians of Chicago

Wednesday, 2 00

Demonstrations in the following Chicago hospitals Chicago Memorial, Children's Memorial Cook County, Grant, Henrotin, Michael Reese Passavant Memorial, Presbyterian, Ravenswood, Research and Educational, St Elizabeth's St Joseph's, St Luke's St Mary of Nazareth University of Chicago Clinics, Wesley Memorial West Suburban

Thursday, 10 00-Stevens Hotel

Panel Round Table Conference-Problems Relating to Hospital Administration and Hospital Standardization Conducted by ROBERT JOLLY, Houston, Texas, and R C BUERKI, M D , Madison, Wis Call Systems for Hospitals JOHN GORRELL, M D , Grand

Rapids, Mich

Administrative Problems of the Small Hospital Glapys BRANDT, R N, Logansport, Ind Nursing Service SISTER MARY LIDWINA, Chicago

Medical Social Service Standards BABETTE JENNINGS, Chicago

Air Conditioning in Hospitals Perry W Swern, Chicago Hospital Income BRYCE L TWITTY, Dallas, Texas

Thursday, 2 00-Stevens Hotel

Standardization of Hospital Furnishings, Equipment and Supplies L M ARROWSMITH, Brooklyn Food Service Mirian C Connelly Baltimore Professional Problems of the Small Hospital Mary E

SAEGCII, R.N., Marquette, Mich Nursing Education Mary M. ROBERTS, R.N., New York

Out Patient Department FREDERICK MACCURDY, M D New York The Cancer Clinic in the General Hospital Frank E

ADAIR, MD, New York The Hospital Pharmacy EDGAR C HAYROW, Paterson, N '

The Front Office of the Hospital LEE C GAMMILL, Little Rock, Ark

Friday

An opportunity will be afforded the hospital delegates to visit Chicago hospitals Special information pertain ing to each institution will be available at the hospital registration and information desk

PRELIMINARY CLINICAL PROGRAM

ARRANGED IN THE FOLLOWING SUBDIVISIONS GENERAL SURGERY, GYNECOLOGY AND OBSTETRICS. ORTHOPEDIL SURGERY, GENITO URINARY SURGERY, THORACIC SURGERY, FRACTURES, AND TRAU MATIC SURGERY, NEUROSURGERY, EXPERIMENTAL SURGERY, PLASTIC AND FACIOMAXILLARY SUR GERY, PHYSICAL THERAPY, ROENTGENOLOGY, TUMORS AND IRRADIATION, OPHTHALMOLOGY, OTOLARYNGOLOGY

GENERAL SURGERY

Monday Afternoon

CHICAGO MEMORIAL HOSPITAL

CHARLES J DRUECE SR GEORGE L BROOKS OTTO SAPHIR and GEORGE LANDAU Symposium Carcinoma of the rectum carcinoma of the colon CHARLES E KARLKE GEORGE L BROOKS OTTO SAPRIR

and George Landau Symposium Peptic ulcer

PASSAVANT MEMORIAL HOSPITAL

SUMMER L KOCH MICHAEL L MASON and HARVEY S
ALLEN Surgery of the hand Dupuytren's contracture Volkmann's contracture nerve and tendon suture burn contractures of the hand and plastic repair with skin grafts chronic tenosynovitis

ST ANTHONY DE PADUA HOSPITAL

R C DRURY Spinal anesthesia

ST BERNARDS HOSI ITAL R J Fasio Blood transfusion merits of methods

ST LUKES HOSPITAL

T HANSON and J JANSEN Treatment of comminuted fractures of the leg WOMEN AND CHILDREN'S HOSPITAL

CLEMENTINE FRANKOWSKI and HELEN M. KOSTKA. VAIL cose veins treatment by injection and by ligation

Tuesday Morning AUGUSTANA HOSPITAL

N M PERCY Operations

ALBERT MERRITT BILLINGS HOSPITAL Chrucal Demonstrations

LESTER R DRAGSTEDT and staff Clinical and experimen

The state of the s A BRUNSCHWIG Pancreatoduodenectomy for carcinoma

of the head of the pancreas H P JENKINS Abdominal wound disruptions and the durability of catgut sutures

CHICAGO MEMOKIAL HOSPITAL

CHARLES E KAHLKE Stomach surgery CHARLES | DRUECE SR Surgery of the colon and rectum

COOK COUNTY HOSPITAL

KARL A MEYER R H JAPPE M I HLBENY AARON ARKIN and RUDOLF SCHINDLER Symposium Surlery of the stomach Operations Dr Gatewood Children's surgery
George G Davis Albert H Montgomery John

HARGER HARRY JACKSON and JOHN G FROST Opera tions

Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs in the labora torses of the Graduate School of Medicine 427 S Honore

EVANGELICAL DEACONESS HOSPITAL FDWARD N HEACOCK Cholecystectomy

GARFIELD PARK HOSPITAL

EDWUND FOREY PAUL SCHMITT HAROLD WAIT SAULEL

PLICE CLAUDE WELDY and FRED DESTERANO Sym posium Gall bladder disease

HOLY CROSS HOSPITAL

V F TORCZYNSKI Cholecystectomy, appendectomy, hys M I BADZUTEROWSKI Thyroidectomy g cases cholecys-

tectomy I P Dybalski Cholecystectomy 3 cases nephrectomy hysterectomy

A I MANTKAS Appendectomy JACKSON PARK HOSPITAL

G M Lucas Clinic W MORLEY SHERIN Gall bladder surgery

Symposium Appendicitis
A Bamberger Surgical aspect
R R. Jamiesov Medi al aspect I I Moore Pathological aspect

LUTHERAN DEACONESS HOSPITAL JOHN D KOUCKY G H MAMMEY and GEORGE H SCHROEDER Operations

> MERCY HOSPITAL Dry Chmc

C F Sawver and associates Unusual cau es of inte tinal obstruction partial and complete gastrectomy M McGutae and associates Pelvic appendicitis obstruc tive raundice

MOUNT SINAI HOSPITAL V Sentraces Operations

J GAULT Technique of high internal saphenous vein liga

P Kaplan Tubulovalvular gastrostomy

PRESBYTERIAN HOSPITAL KELLOGG SPEED ALBERT H MONTGOMERY DR GATE

woon and associates Operations V C DAVID C B DAVIS and E M MILLER Dry clinics

> RAVENSWOOD HOSPITAL Dry Clinic

P I SARMA Varicose veins ligation and obliterative

R E DYER End results of gastro-enterostomies dem onstration of cases

D B POND and R F GREENING Osteomyelitis

J J MOORE Tumors of breast
D L JENKINSON X ray interpretations GEORGE DE TARNOWSKY Exstrophy of bladder C J GEIGER Ectopic ureter and absence of vagina, cervi

cal carcinomas M W FIELD Obstetric practice by general practitioner

W F GROSVENOR Toxemia in pregnancy
W C HAMMOND Endometriosis

MICHAEL REUSE HOSPITAL

D C Straus Thyroid operations Ralph B Bettman and William Tannenbaum Gall bladder surgery

A A STRAUSS Gastro intestinal surgery JAMES PATEJOL Operations

P SHAPIRO Operations

Symposium Gastro Intestinal Diseases A A STRAUSS Surgical treatment of peptic ulcer S STRAUSS Pre and postoperative care of the patient JAMES PATEJDL Perforating ulcer, surgical treatment JACOB MEXER Medical care of the ulcer patient

Symposium Carcinoma of the Rectum A A STRAUSS Surgical S STRAUSS Surgical diathermy, after care and results of surgical diathermy

M Appet. Histocytic variation in cancer tissue
Gustav Kollisher. History of surgical diathermy
Orto Saphir. Pathology of the rectum following surgical diathermy

RESEARCH AND EDUCATIONAL HOSPITALS GEZA DETAKATS Lumbar sympathectomy operation

Symposium Neurocirculatory Diseases
R Bruver Use of neosynephrine in spinal anesthesia WILLIAM C BECK Selection of cases for sympathectomy. demonstration of sympathectomized patients, evaluation of results, management of lymphedema

F K HICK Vascular accidents associated with coronary occlusion

H C LUETH Unusual reactions following the use of mitro glycerine GFZA DETALATS Treatment of acute arterial occlusion,

operability of hypertension, demonstration of cases
P J Sarma and H L Mishkin The treatment of varicose veins and ulcers

J T REYNOLDS Amputations in peripheral vascular dis

ST ANTHONY DE PADUA HOSPITAL JOSEPH ZABOKRTSKY Operations

ST BERNARD'S HOSPITAL J T MEYER, E J MEYER and R J MEYER Thyroidec

W. G. Epstein and M. Mennite. Abdominal surgery and differential diagnosis of acute abdominal adhesions

ST JOSEPH'S HOSPITAL

WILLIAM C BECK Thoracic surgery Austin A Hayden Conservation of hearing mastoid and sinus surgery Archibald Houne Control of contagion in surgical dis

WILLIAM H G LOGAN Oral surgery FRANKLIN B McCARTY Gall bladder surgery CHARLES M McKENNA Undescended testicle HUGH McKenya Fractures Conservative surgery in dia

betic gangrene
FRANE THEIS Peripheral circulatory diseases

Pathofogical and radiological material illustrating the above will be presented by LAWRENCE HINES, pathologist, and WILLIAM E ANSPACH, radiologist

ST LUKE'S HOSPITAL

WILLIAM R CUBBIAS Arthroplastics of hip joint Guy Poverus Regional ileitis, local bowel resection for malignancy

H I MEYER Hashimato's disease H E Mock Operations

ST MARY OF NAZARETH HOSPITAL

GEDRGE MUELLER Regional ileitis EDWARD WARSZEWSKI Ulcerative colitis

VETERANS ADMINISTRATION FACILITY PAUL F BROWN Operations

WESLEY MEMORIAL HOSPITAL R W McNealy, Emory Strauser and F L Hussey Gastric surgery

Tuesday Afternoon CHICAGO MEMORIAL HOSPITAL

BENNETT R PARLER Thyroid surgery

COOK COUNTY HOSPITAL EDWARD I LEWIS Operations

HOLY CROSS HOSPITAL

M J BADZMEROWSKI Pre and postoperative treatment of thyroid disease

JACKSON PARK HOSPITAL HARRY E L TIMM Operations

MERCY HOSPITAL

C L MARTIN Rectal neoplasms and inflammations

MUNICIPAL CONTAGIOUS DISEASE HOSPITAL ARCHIBALD HOYNE and associates Intubation and trache otomy, discussion of the advantages and disadvantages of intubation and tracheotomy

PASSAVANT MEMORIAL HOSPITAL

I R BUCHBINDER, A C IVY and ARTHUR BYFIELD Symposium on the biliary tract

MICHAEL REESE HOSPITAL

Dry Clinic NATHAN CROWN The use and abuse of the injection treat

ment of hernia, suitable and unsuitable cases, methods
Leo Zimmerman Surgery of direct inguinal hernia
RUDOLF SCRINDLER The use of the gastroscope and its value to the surgeon

SAMUEL GOLDBERG Pooled human convalescent serum treatment of surgical streptococcus hemolyticus infec

JAMES PATEJOL Congenital duodenal obstruction in new born, duodenal diverticuli causing clinical symptoms

Dry Chnic LED ZIMMERMAN Diseases of veins

PHILIP SHAPIRD Recent advances in the treatment of sancose veins

BERNARD PORTIS Embolism of the peripheral arteries SAMUEL PERLOW Surgical measures used in the treatment of peripheral circulatory disturbances, differentiation

between arterial and arteriolar spasticity as an aid in the selection of cases for sympathetic ganglionectomy

ST LUKES HOSPITAL

WILLIAM HAZLETT Pseudohermaphroditism, carcinoma of breast in a fifteen year old girl

ST MARY OF VAZARETH HOSPITAL P DORETTI and T PLANT Abdominal operative charc

VFTERANS ADMINISTRATION FACILITY PALL F BROWN Symposium Stomach surgery

WOMEN AND CHILDREN'S HOSPITAL Management of Diseases Complicating Surgery

CAROLYN MACDONALD Syphilis Rose Menendian Endocrine disorders RUTH RENTER DARROW Diabetes

II ednesday Morning AUGUSTANA HOSPITAL

A T LUNDGREN EARL GARSIDE R J E OBEN and I W Nuzum Operations

CHICAGO MEMORIAL HOSPITAL

PETER S CLARK VANCE RAWSON GEORGE LANDAU and Orro Sapria Call bladder symposium LEO M ZIMMERMAN and RICHARD E HELLER Fundamen tal problems in the surgical treatment of inguinal hernia modern management of varicose veins

CHILDREN 5 MEMORIAL HOSPITAL A H MONTGOMERY J IRELAND J GRAHAM W POTTS A Drogs and J Mussil Operations and demonstration of cases

COLUMBUS HOSPITAL

D & ORTH and L NORA Bona and joint tuberculosis perstonetis Rollier treatment

COOK COUNTY HOSPITAL

RAYMOND W MCNEALY MANUEL LICHTENSTEIN FRED ERICK TICE RICHARD H JAFFE and M J HUBENY Symposium Diseases of the gall bladder RAYMOND W MCNEALY VICTOR SCHEAGER GEORGE L AFFELBACH ROGER T VAUGHAN and MARSHALL DAVISON Operations

Members of the surgical staff will give demonstrations in surgical techniqua upon cadavers and does in the labo ratories of the Graduate School of Medicine 427 S Honore Street

EVANSTON HOSPITM

Symposium Colon Surgery L D Syor P Diagnosis

E R CROWDER Roentgenology

E L BENJAMIN Pathology FREDERICK CHRISTOPHER Surgery W R PARKES Prognosis in malignancy

Dry Clinic MAR, US HOBART Operative treatment of low back pare

JAMES GRIER Common bile duct obstructions
W K JENNINGS Prevention of recurrence in femoral hernia operations

HOLY CROSS HOSPITAL

CHARLES M Mckeyna Cholecystectomy hermography J F Dynalski Open reduction of fracture of lemur F Krapt Hysterectomy perincorrhaphy F SALETTA Hysterectomy permeorrhaphy operation for shortening round ligament

M STRIKOL Appendectomy hermorrhaphy

JACKSON PARK HOSPITAL

ARRIE BAMBERGER Pre and postoperative treatment of surrical cases

C C CLARK and H HOYT COY Operations

LUTHERAN DEACONESS HOSPITAL GEORGE O SOLEM Surgical indications in peptic ulcer

MOTHER CABRINI HOSPITAL EUGENE I CHESROW and ALBERT I CHESROW Opera

E P OLIVIERI and V \ EMANLELE Demonstrations

MOUNT SINAL HOSPITAL L I GREENE Anaerobic hemolytic streptococcus infec

tion (Meleney & disease) JACOB M MORA Thyroidectomy in the aged D WILLIS Removal of foreign (metallic) bodies from

tissues with aid of a new instrument M GREENE Acute intestinal obstruction

I TEACE Postoperative pulmonary complications with special reference to massive pulmonary collapse M L ARKIN The surgical diabetic L LOTDIN and N I FOY Medicosurgical discussion

L FELDUAN Streptococcic bacteriemia precipitated by surgical procedures

MUNICIPAL TUBERCULOSIS SANITARIUM

CLEMENT L MARTIN Anorectal tuberculosis MAX THOREK Surgery in tuberculous patients

POSTGRADUATE HOSPITAL EMIL RIES Fpisacro-iliac lipomas with backache

PRESBYTERIAN HOSPITAL V C DAVID KELLOGG SPEED C B DAVIS DR GATE BOOD E M MILLER A H MONTGOMERY and asso ciates Operations

MICHAEL RELSE HOSPITAL

M L PARKER LEE ZIMMERHAN and SAMUEL GOLDBERG Operations B PORTIS Thyroid surgery

Samuel Perion Peripherovascular surgery
A A Strauss S Strauss and J Patejol Gastro intes

tinal surgery RALPH B BETTHEN and WILLIAM TANNENBEUM Gall

bladder operations Dry Clinic Surgery of the Gall Bladder

SAMUEL SOSKIN Preparation of the liver for surgery R A ARENS The technique of cholecystography A M SERBY S PORTIS and G LICETENSTEIN The evalu ation of liver function tests gall bladder diet survey of

postoperative results of the gall bladder group
RALPH B BETTMAN LED ZIMMERMAN and WILLIAM TAN NENDALE MIction picture and diagrammatic demon strations The technique of cholecystectomy choledocos-

tomy choledochogastrostomy or enterostomy RESFARCH AND EDUCATIONAL HOSPITALS

W II COLE Thyroidectorny operation for pyloric obstruction

P J SARMA and H L MISHELY Clinic on varicose veins Symposium Diseases of the Thyroid

W H COLE I re operative care and postoperative com plications

C B PUESTOW Use of silk in thyroidectomy
L SEED and R BRUNNER Blood pressure studies during thyroidectomy

I M MORA Hepatic damage in hyperthyroidism

R W KEETON Cardiac complications of hyperthyroidism W H Cole Tracheal collapse

JOHN HOWE The thyroid gland as observed at autopsy in

patients with diseases other than hyperthyroidism I H BAILEY Bacteriological studies in the operating room

ST ANNE'S HOSPITAL

THOMAS E MEANY Fractures and tendon transplanta

JOHN L KNAPP and JOHN W KEANE Surgical clinic,

demonstration of cases GEORGE F THOMPSON Surgical clinic, demonstrations

ST ANTHONY DE PADUA HOSPITAL

S I DONLON and H P SULLIVAN Operations and demonstration of cases

ST BERNARD'S HOSPITAL

G M CUSHING The surgical treatment of perforated gastric ulcer

ST LUKES HOSPITAL

S W McARTHUR and associates Symposium Surgical eonditions of the gall bladder and common duct

GRANT LAING Pre operative and postoperative care
S W McArtium Operative indications type of proeedure with some technical details

U S MARINF HOSPITAL

O E Napeau Results in hernia surgery F C LUTTON and R W FLYNN Spinal anesthesia

WESLEY MEMORIAL HOSPITAL WILLIAM MILLER Review of gall bladder surgery

FRANCES E WILLARD HOSPITAL VICTOR L. SCHRAOER Clinic

NOMEN AND CHILDREN'S HOSPITAL

PEARL M STETLER Abdominal surgery

Il ednesday Afternoon COLUMBUS HOSPITAL

D A ORTH, C J SCHERIBEL and I D NORA Fxperi mental thyrotoxicosis

I L SPINACE Valve operation

MICHAEL REESE HOSPITAL

Symposium SAMUEL PERLOW Paravertebral alcohol injections for the reliel of cardiac pain

LEO ZIMMERMAN and OTTO SAPRIR Benign tumors of the thyroid gland

SAMUEL GOLDBERG Acute mesenteric lymphadenitis, strangulated hermas in premature inlants THOMAS J MERAR Rectal complications of lympho

granuloma inguinale CASPER EPSTEIN Fractures of the jaws

M L PARKER Carcinoma of the large bowel

ST ANNES HOSPITAL HARRY J Dootey Urological clinic and demonstration

JOHN J GEARIN and E P GRAMER Surgical chinic ST BERNARD'S HOSPITAL HERMAN DEFEO The medical management of cholecystic

diseases B C Cushway and associates Roentgen studies of gall bladder diseases

S L GOVERNALE Cholecystotomy vs cholecystectomy CHESTER GUY Pathology of the gall bladder

WESLEY MEMORIAI HOSPITAL GOY S VAN ALSTYNE Abdominal surgery

FRANCES E WILLARD HOSPITAL LOUIS F PLZAL Clinic

Thursday Morning

AUGUSTANA HOSPITAL N M PERCY Operations

CHICAGO MEMORIAL HOSPITAL PETER S CLARK, LEO M ZIMMERMAN and M L WEIN STEIN Gall bladder surgery

COOK COUNTY HOSPITAL

RICHARD H JAFFE Pathological conference KARL A MEYER GEORGE G DAVIS, ALBERT H MONT GOMERY and MAX THOSEK Operations

Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs at the Graduate School of Medicine, 427 S Honore Street

PVANGELICAL DEACONESS HOSPITAL Inti I PERL Stomach resection

HOLY CROSS HOSPITAL

J I RANCIS RUZIC Choledochotomy and dilatation of com mon duct, vaginal hysterectomy, cholecystectomy
I Francis Ruzic, D DiCiro and Walter Eisen Resec

tion of superior hypogastric ganglion

D DICIRO Kidney neoplasm
FRANCIS STREYSMAN Varicocelectomy
JOHN SIMONALTIS Pelvic laparotomy

H LINOIS MASONIC HOSPITAL

CHARLES DRUECK Pruritus ani-cases due to systemic disturbances Ovarian dysfunction (vicamous pruritus), hypothyroidism, spastic colon, obesity

TACKSON PARK HOSPITAL GEORGE M LUCAS Operations

LUTHERAN DEACONESS HOSPITAL JOHN D KOUCKY, G H MAMMEN and GEORGE H SCHROEDER Operations

MERCY HOSPITAL

L D MOORHEAD Symposium Goiter

PASSAYANT MEMORIAL HOSPITAL PAUL STARR Symposium Diseases of endocrine glands

PRESBYTERIAN HOSPITAL V C DAVID, C B DAVIS, WILLIAM MILLER and asso

ctates Operations KELLOGG SPEED DR GATEWOOD and A H MONTGOMERY Dry chaics and symposia

MICHAEL REESE HOSPITAL

A A STRAUSS and S STRAUSS Gastro intestinal surgery D C STRAUS General surgery

Thyroid Symposium

D C STRAUS Group study and demonstration of thyroid records, surgical management of hyperthyroidism S Sosain The endocrane disturbance in a thyroid disease

L N KATZ Disturbed physiology of the cardiovascular system in thyroid disease

M Lev Some clinical aspects of the heart in hyper thyroidism medical management of hyperthyroidism A S Bouning and L N Karz. The electrocardiogram in thyroid disease

W HAMBURGER Arrhythmias in thyroid disease B PORTIS Outpatient clinic management of hyperthy roidism

B Porris and H Roth Treatment of hyperthyroidism complicated by pregnancy and syphilis R Levive Experimental treatment of hyperthyroidism

RESEARCH AND EDUCATIONAL HOSPITALS
C B PUESTOW Operations Choledochostomy carcino

ma of rectum
Symposium Gall Bladder Diseases
C B PUESTOW The effect of cholecystectomy on pressure

in the choledochus gall bladder fistulæ
Frantin Foley Differential diagnosis between intra
hepatic and extrahepatic jaundice
W. H. Colf. The role of cystic duct obstruction to gall

bladder disease
A HARTUNG The advantage of combining gastro intes

tinal series with cholecystography
ST ANTHON'S DF PADUA HOSPITAL

F B OLENTIVE Operations and demonstration of goiter and abdominal surgery cases

ST JOSEPH'S HOSPITAL

WILLIAM C BECK Thoracic surgery
ARCHIBALD HOYNE Control of contagion in surgical dis
cases

MILLIAM H G LOGAN Oral surgery
FRANALIN E MCCARTY Gall bladder surgery
CHARLES M MCAENA Undescended testucle
HUGH MCAENA Fractures conservative surgery in dia
beth gangrene

Detic gangrene
FRANK TREES Peripheral circulatory diseases
Pathological and radiological material illustrating the
above will be presented by Lawrence Hives pathologist
and WILLIAM E. ANSPACE radiologist

ST LUKES HOSPITAL

F. L. McVitlan Tumors of the colon
H. E. McCK. Infected granuloma, gall bladder disease
A. R. Moxxow. Acute surgical abdomen
C. E. Shannon. Acute and chronic pancreatitis
John Luxpourst. Appendichts
Joury Parsule. Audlary abscess

ST MARY OF NAZARETH HOSPITAL

J C Hill Pathologic discussion of operative findings
T LARKOWSKI Symposium Hermas and their repair

VETERANS ADMINISTRATION FACILITY
PAUL F BROWN Operations

WESLEY MEMORIAL HOSPITAL

R W McNealy and associates Surgery of jaundiced
patients

patients
GUY S VAN ALSTYNE Carcinoma of the breast combined
surgical and x ray treatment

FRANCES E WILLARD HOSPITAL
A E STEWART Clinic

WOMEN AND CHILDREN'S HOSPITAL
PEARL M STETLES and MARIE ORTHAFER
Gastrointestinal clinic gastroscope technique
Alice Covklin Thyroidectomy
ESTHER RAIN Repair of ventral bernis

Thursday Afternoon
CHICAGO MEMORIAL HOSPITAL

Bennett R Parker, Leo M Zimmerman Walter S Priest Otto Saphir and George M Landau Sym posium Thyroid disease

FRANK WRIGHT, ALBERT ZRUNK LEO M ZIMMERMAN M L WEINSTEIN and OTTO SAPHIR Symposium Blood translusion

COOK COUNTY HOSPITAL

RAIFH B BETTHAN and LOWARD J LEWIS Operations
HOLY CROSS HOSPITAL

J FRANCIS RUZIC Biliary tract surgery

MICHAEL REESE HOSPITAL

Symposium Gastro-Intestinal Surgery
LEOV BLOCK The medical treatment of ulcerative coluts
A A Strates The surgical management of ulcerative

S STRAUSS The use of ileostomy in ulcerative colitis and carcinoma of the colon
OTTO SAPHUR Pathology of ulcerative colitis Discussion

R ARENS Y ray diagnosis of ulcerative colitis and peptic ulcer Discussion A 4 Strauss and H F Binswanger Medical and

A A STRAUSS and H F BINSWANGER Medical as surgical treatment of terminal ileitis RESEARCH AND EDUCATIONAL HOSPITALS

Symposium Diseases of the Gastro-Intestinal Tract George Mulles Pathology of carcinoma of stomach W. H. Cole. Total gastrectomy T. I. Wacijowski, "Kray diagnosis of carcinoma of

stomach

C L Bracus Anemia associated with total gastrectomy

M H STREICHER Diagnosis of carcinoma of the rectum C B Puestow Surgical treatment of carcinoma of the rectum BERNARD PORTIS Surgical treatment of complicated

duodenal ulcers

F L McMillan Regional ileitis

J L Spivack Tubovalvular stoma with particular refer

E SPIVACE Tubovalvular stoma with particular revenue to gastrostomy

II O WERNICKE The injection treatment of hermas.

ST ANTHONY DE PADUA HOSPITAL
W II Brankey Operations

ST BERNARD'S HOSPITAL

S HECTOR and S S DiboyY Imperforate anus with atresia of large bowel

ST LUKES HOSPITAL

H E JOYES Reconstruction of the common duct.

LEE STRONG Appendictis

ST MARY OF NAZVRETH HOSPITAL
A PARTIFILO Aseptic gastro-intestinal anastomosis
P Czwaliński Surgical incisions
F Tenovak Abdominal operations

WESLEY MEMORIAL HOSPITAL

E B PERRY and H E E BARNARD Abdominal surgery FRANCES E WILLARD HOSPITAL

OHS M WALTER, Chaic

WOMEN AND CHILDREN'S HOSPITAL
LEGIA GIRVOTAS Cholecystectomy

Friday Morning

ALBERT MERRITT BILLINGS HOSPITAL

H LIVINGSTONE Anesthesia and the circulation N ROOME, H WILSON H N HAPKINS and D B PHEMISTER Causes and treatment of surgical shock W E ADAMS Intrathoracic operation and the circulation

COLUMBUS HOSPITAL

M J SEIFERT and F A O'MALLEY Gastro intestinal sur

COOK COUNTY HOSPITAL

DR GATEWOOD Children's surgery RALPH C SULLIVAN, VERNON C DAVID, HARRY JACASON

and Frank J Jirka Operations
Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs in the labo ratories of the Graduate School of Medicine, 427 S Honore Street

HOLY CROSS HOSPITAL

FRANK FRAIDER and NICHOLAS PAVLETIC Hysterectomy,

cesarean section, cholecystectomy
STEPHEN BIEZIS Cholecystectomy, hysterectomy, repair of incisional bernia

FELIX WINSLUMAS Inguinal hermorrhaphy

JAMES GALLAGHER Cholecystectomy
WILLIAM REILLY Cholecystectomy and appendectomy M J BADZMIEROWSKI and H IRACE Hysterectomy

ILLINOIS MASONIC HOSPITAL

CHARLES H PARKES, CARL F STEINHOFF and WALTER C
BORNEMETER Surgical diabetes—organization of the service for the care of the surgical diabetic where an intimate relationship exists between the surgeon and the internist which is greater than that of a consultation, review of cases on service for past ten years, presentation of treatment involved in surgical diabetes protomine insulin, anesthesia, operative and postoperative cases, lower extremity

JOHN R HARGER and JOHN H GILMORE Gall bladder surgery-bistory building Personal history in detail, laboratory findings and practical values of various tests, x ray, development to date in this diagnostic field, dem onstration of operative technique with use of peridural route for anesthesia in the cases, discussion of advantages of peridural anesthesia over spinal and lessening of baz ard, greater satisfaction than with any type of general

IACKSON PARK HOSPITAL

A BAMBERGER, H H Cox and C CLARK Operations

LUTHERAN DEACONESS HOSPITAL

JOHN D KOLCEY, G H MAMMEN and GEORGE II SCHROEDER Operations GEORGE O SOLEM Surgical indications in peptic ulcer

MOUNT SINAI HOSPITAL

A A STRAUSS, S F STRAUSS and B SAYRE Operations M Lewison Surgery in cardiovascular diseases H J ISAACS Coronary disease simulating acute abdomi nal catastrophies

E B FRELICH Surgery in tuberculosis

I DAVIDSORN Clinical pathological conference

PASSAVANT MEMORIAL HOSPITAL SAMUEL J FOGELSON Experimental surgical problems

POSTGRADUATE HOSPITAL

L ZIMMERMAN Varicose veins and their complications

PRESBYTERIAN HOSPITAL

V C DAVID, KELLOGG SPEED, C B DAVIS, DR GATE WOOD, WILLIAM MILLER and A H MONTGOMERY Operations

MICHAEL RELSE HOSPITAL

J PATEJOL, P SHAPIRO, R CRAWFORD, B PORTIS, S GOLDBERG, M L PARKER and LEO ZIMMERMAN Oper ations

RESTARCH AND EDUCATIONAL HOSPITALS

R B MALCOLM Operative clinic Neck dissection, carci noma of breast, surgical pathology of breast tumors Clinical Demonstration

T J WACHOWSKI X ray treatment of carcinoma of the breast

ARRIE BAMBERGER Ewing tumor with case report S R ROSENTHAL The toxin and antitoxin of burns W H COLE Acute pancreatitis

ST ANTHONY DE PADUA HOSPITAL

J J Spraffa Abdominal surgery and demonstration ST CLIZABETH'S HOSPITAL

E D KALZELAGE Thyroid disease

ST LUKE'S HOSPITAL

MEDICAL BOARD Staff clinic, including papers, discussion and pathological demonstrations

WESLEY MEMORIAL HOSPITAI EARL LATIMER Unusual breast tumors

Friday Afternoon COOK COUNTY HOSPITAL

G FROST Operations SUMNER L LOCH Surgery of the hand E H WARSZEWSKI Operations

HOLY CROSS HOSPITAL CHARLES GALANTI Osteogenic sarcoma

EMIL WEISS Splenomegaly JACKSON PARK HOSPITAL

HARRY E L TIMM Operations

MOUNT SINAI HOSPITAL I DAVIDSOHN Differential diagnosis of infectious mono nucleosis simulating surgical conditions, demonstration of technique

ST BERNARD'S HOSPITAL

J M MAHONEY Infective granuloma of the cecum simu lating a neoplasm, case demonstration

ST ELIZABETH'S HOSPITAL

J K NARAT Pre and postoperative intravenous admin istration of fat emulsion

Days to be Announced COOK COUNTY HOSPITAL

VICTOR L SCHRAGER Symposium Appendicitis SUMPLER L KOCH Symposium Hand infections
HARRY JACKSON Symposium Skull fractures The Price of the theory of the VERNOV C DAVID Symposium Surgery of large bowel

GYNECOLOGY AND ORSTETRICS

Monday Afternoon CHICAGO LYING-IN HOSPITAL FRED L ADAIR and staff Motion picture demonstration

of Cesarean section

COOK COUNTY HOSPITAL FREDERICA H FALLS Operations A F Last Puerperal sepsis ward walk

HOLY CROSS HOSPITAL

PALL LANGER Application of obstetrical forcers (manukin demonstration)

ILLINOIS MASONIC HOSPITAL

HAROLD W. MILLER and WALTER BORNEWEIGH Charian cysts uterine fibroids Dry clinic for demonstration of cases and general discussion operation during which use and value of peritoneoscope will be demonstrated F O BOWL and BELLAH WALLIN Cesarean section Indi cations comparison of results in different types demon

stration of operative technique of for cesarean section ST BERNARD'S HOSPITAL

E A RACE and F J STUCKER Cesarean section

ST LUKE S HOSPITAL

OBSTETRICAL STAFF Ward walk MOMEN AND CHILDREN'S HOSPITAL

ANNIE E BLOUNT Operations

Tuesday Morning CHICAGO LYING IN HOSPITAL

Fred L. ADAIR WILLIAM J. DIECEMAN. M. EDWARD DAVIS H. C. HESSELTINE and staff. Cesarean section Motion picture demonstration of colpoclesis operation

COOK COUNTY HOSPITAL

CAREY CLIBERTSON and A. E. KANTER Operations D 5 HILLIS Treatment of abortion ward walk

PRESBYTERIAN HOSPITAL N 5 HEANEY CAREY CLIBERTSON & F KANTER E D

ALLEN and II BOYSES Operations MICHAEL REFSE HOSPITAL

J L BARR J E LACENER, WILLIAM RUBOWITS I F Stein and Ralph Reis Operations JOSEPH L BARR Ward rounds WILLIAM RUBOVITS Ward rounds

ST LUKES HOSPITAL

H O JONES and associates Demonstration climic
W T CARLISLE Endometrial studies
ELGENE CARY Treatment of occuput posterior

WESLEY MEMORIAL HOSPITAL MARK COLDSTINE and associates Uterine bleeding

FRANCES E WILLARD HOSPITAL ASCHER H GOLDFINE Clinic

NOMEN AND CHILDREN'S HOSPITAL MARY Entry WILLIAMS Removal of abdominal tumors OTTLIE ZELEZNY Electrocoagulation of the cervix uters

Tuesday Ifternoon CHICAGO LYING-IN HOSPITAL

WILLIAM J DIECEMANN and staff Dry clinic Eclamisia Motion picture demonstration of Lorceps delivery

COOK COUNTY HOSPITAL P GREENHILL Operations

L Reported and I H BLOOMFIELD Symposium The toxemias of pregnancy

PASSAVANT MEMORIAL HOSPITAL ARTHUR H CERTIS and CEORGE II GARDNER, Operative and demonstration plinic

ST BERNARDS HOSPITAL

S S SCHOCHET Fibroids

ST ELIZABETH'S HOSPITAL J R LAVIERI Cesarean section

ST WARY OF VAZARETH HOSPITAL L Kozakiewicz and M Uznanski Tovermiss of preg

FRANCES E WILLARD HOSPITAL

ASCHER H GOLDFINE Clinic

WOMEN AND CHILDREN'S HOSPITAL FLOISE PARSONS Laginal hysterectomy vaginal stendigs tion ligation of tubes per vaginal route

II ednesday Morning CHICAGO LYING IN HOSPITAL

FRID L ADAIR WILLIAM J DIECKMAN M EDWARD DAVIS H C HESSELTINE and staff Operations and demonstration of cases

COOK COUNTY HOSPITYL

C. W. BARRETT Operations

J. F. Fitzgerald Heart disease in pregnancy ward walk EVANGELICAL DEACONESS HOSPITAL

A J Schoenberg Hysterectomy JACKSON PARK HOSPITAL

CHARLES I GREENE LOUIS H STEEN W J NIXON DAVIS JR and NORMAN ZOLLA Treatment of contracted pelves by cesarean section version and forceps PASSALANT MEMORIAL HOSPITAL

CEORGE H CARDNER and ARTHUR II CURTIS Gyneco-logical pathology—demonstration and conference

PRESBYTERIAN HOSPITAL N S HEANER CARRY CLIBERTSON A E KANTER E D

ALLEY and H. Royses Demonstration of cases

RESEARCH AND EDUCATIONAL HOSPITALS FREDERICK H FALLS Eclamptogenic toxemia low cervical cesarean section under local anesthesia. W H BROWNE Progestin in the treatment of abortion G H. Rezer Modification of the Friedmann reaction

MICHAEL REESE HOSPITAL

JOSEPH L BAER Ward rounds MILLIAM RUBOVITS Ward rounds Dry Chinc
JOSEPH L BAER Shifting trends in the treatment of

prolapse of the uterus

JULIUS E LACKNER Recent investigations in the action

of progesterone
WILLIAM RUBOVITS Fostoperative vaginal antisepsis
IRVING F STEIN Evaluation of the "safe period"
RALPH \ REIS Mammography

RAIPH \ REIS \ \text{Nammography}
LESTER E \ FRANKENTHAL, IR Treatment of vulvovagmits
\text{MICHAEL L LEVENTHAL The Manchester operation for
the cure of cystocele and prolapse

HENRY BUXBAUM The role of spermotoxin in temporary sterility

A F LASH Early diagnosis of carcinoma of the uterus
E J DECOSTA The use of progesterone in the prevention
of habitual abortion

ALFRED J KOBAK Maternal mortality in Chicago HERMAN STRAUSS Routine palpation of the ureters during hysterectomy

ST LUKE'S HOSPITAL

GEORGE C FINOLA Blood calcium studies during pregnancy JAMES A GOUGH Chorionenithelioma

JAMES A GOUGH Chorionepithelioma

WASHINGTON BOULEVARD HOSPITAL PAUL C Fox Stenlity

WESLEY MEMORIAL HOSPITAL

CHARLES B REED, WILLIAM B SERBIN and G C RICHARD-50 Moving picture demonstration of low forceps, breech extraction with forceps on aftercoming head spontaneous breech—manual aid

WOMEN AND CHILDREN'S HOSPITAL
FLORENCE HARK Frenatal care with reference to the baby
RUTH R DARROW Treatment of icterus gravis
BERTHA VAN HOOSEN Maternity mortality

Wednesday Afternoon
CHICAGO LYING IN HOSPITAL

H C HESSELTINE and staff Nonconvulsive toxemia of pregnancy Motion picture of hirth injury

CHICAGO MEMORIAL HOSPITAL

PAUL M CLIVER, JULIA C STRAWN, HARRY L MEYERS, B E TUCKER and WALTER WIBORC Plastic repair JAMES E FITZGERALD, WILLIAM F HEWITT GEORGE N SCHIFF and HARRY BENARON CESARCAN SECTION

COOK COUNTY HOSPITAL

W T Carlisle Operations
D S Hillis J H Bloomfield and A F Lasin Symposium Cesarean section

RESEARCH AND EDUCATIONAL HOSPITALS
FREDERICK H FALLS and staff Operations Symposium
Gynecological tumors
FREDERICK H FALLS Will a CARCINGARY A CONSTITUTE OF THE PROPERTY HE FALLS Will a CARCINGARY A CONSTITUTE OF THE PROPERTY HE PROPE

FREDERICK H FALLS Vulva carcinoma, demonstration of cases, vulvectomy under local anesthesia
R \ Lifvendahl Solid tumors of ovary, removal of

ovarian cyst
II H Hill Early carcinoma of cervix

WOMEN AND CHILDREN'S HOSPITAL
CONSTANCE O'BRITIS Operations
BERTIA VAN HOOSEN AND MADDE HALL WINNETT Anesthesia in obsteting
BEATRICE E TUCKER Parasacral anesthesia

Thursday Morning

CHICAGO LYING IN HOSPITAL

Fred L Adair, William J Dieckmann, M Edward Davis, H C Hesseltine and staff Cesarean section Motion picture demonstration of blood transfusion

CHICAGO MEMORIAL HOSPITAL

PAUL M CLIVER JULIA C STRAWN, HARRY L MEYERS BEATRICE I. TLAKER and WALIER WINDORG Sympo sum The treatment of prolapse of the uterus, cystocele and rectocele at various ages HAMES E FITAGERALD WILLIAM F HEWITT, GEORGE N

MES E FITZGERALD WILLIAM F HEWITT, GEORGE N SCHIFF and HARRY BENARON Indications and technique for cesarean section, nerve block in obstetrics

COOK COUNTY HOSPITAL

EGON W FISCHMANN Operations
J E FITZGERALD and L RUDOLPH Symposium Ectopic pregnancy, its diagnosis and treatment

MOUNT SINAI HOSPITAL

A H KLAWANS Endometriosis
A E KANTER Masculinizing tumors of ovary
A F LASH Pelvic infections

A H E GOLDFINE, C NEWBERGER, H BUXBAUM and associates Symposium Obstetrical hemorrhages

L RUPOLPH Physiological and clinical aspect of occupito-

posterior position
A ARMIN, I A RABENS and R GORDON Dry clinic,

PRESBATERIAN HOSPITAL
N S HEANEY CAREY CULBERTSON, A D LANTER E D

N S HEANEY CARRY CULBERTSON, A L KANTER E I ALLEN and H BOYSEN Operations MICHAEL REESE HOSPITAL

Joseph L Baer Ward rounds William Rubovits Ward rounds

ST ANTHONY DE PADUA HOSPITAL M A WEISSLOPP Operations

ST LUKE'S HOSPITAL

II K Gibson The late toxemias of pregnancy

WESLEY MEMORIAL HOSPITAL
MARK GOLDSTINE and associates Vaginal plastics

Thursday Afternoon
CHICAGO LYING IN HOSPITAL

M EDWARD DAVIS and staff Placenta previa abruptio placenta Motion picture of postpartum hemorrhage

COOK COUNTY HOSPITAL

FREDERICK H FALLS Operations
J H BLOOMFIELD and D S HILLIS Symposium Late
hemorrhages of pregnancy

PASSAVANT MEMORIAL HOSPITAL
ARTHUR H CURTIS and GEORGE H GARDNER Operative
and demonstration clinic

ST MARY OF NAZARETH HOSPITAL
H LITTLE Ovarian tumors

Friday Morning

CHICAGO LYING-IN HOSPITAL

FRED L ADAIR WILLIAM J DIECKMANN, M EDWARD

DAVIS, H C HESSELTINE and staff Cesarean section

COOK COUNTY HOSPITAL A E KANTER and CARRY CULBERTSON Operations

A F LASH Toxemus of pregnancy ward walk

PRESBYTERIAN HOSPITAL N S HEAVEY CAREY CULBERTSON A E KANTER E D

ALLEN and H BOYSEN Operations

MICHAEL REESE HOSPITAL

J L BARR J E LACKNER WILLIAM RUBOWITS I F STEIN and RAIPH REIS Operations IOSEPH L. BAER Ward rounds WILLIAM RUBOVITS Ward rounds

ST BERNARDS HOSPITAL

I B HARBERLIN Hysterectomy and its indications

ST LUKES HOSPITAL JAMES E FITTGERALD Heart disease in premancy

WESLEY MEMORIAL HOSPITAL CHARLES B REED WILLIAM B SERBY and G C RICH ARDSON Ablatio placenta placenta przysa

WOMEN AND CHILDREN'S HOSPITAL BERTHA VAN HOOSEN and MAUDE HALL WINNETT SUIZ ical cases complicating obstetrics

Friday Afternoon

CHICAGO LYING-IN HOSPITAL FRED L ADAIR and staff Dry choic Motion picture demonstration of episiotomy

COOK COUNTY HOSPITAL CAREY CULBERTSON Operations

L RUDOLPH Symposium Prolonged labor, constriction ring dystocia

MERCY HOSPITAL H E SCHMITZ and associates Symposium on operative

gynecology RESEARCH AND EDUCATIONAL HOSPITALS

FREDERICK II FALLS and staff Symposium Gynecological plastic operations with special reference to the use of local anesthesia

FREDERICS H FALLS Vaginal hysterectomy for proci dentia under local anesthesia M J SCHMERVILLE Anterior colporrhaphy and interpo i

tion operation under local anesthesia
WHIIAM H BROWNE Sturmdorf Kelly incontinence op-

eration and permeorrhaphy under local anesthesia

WOMEN AND CHILDREN'S HOSPITAL

CATHERINE TRUE Addominal gynecological cases
ELOISE PARSONS Treatment of sterrity treatment of eroded cervix by cautery lipsodol visualization of uterus and tubes

Days to be Announced COOK COUNTY HOSPITAL J P GREENHIL C W BARRETT W T CARLISLE EGON W FISCHMANN FREDERICK II FALLS A. E. KANTER

and CAREY CULBERTSON Symposium on fibroids HENROTIN HOSPITAL

EDWARD L CORNELL Operations and demonstration of

CHANNING II BARRETT and LEE STONE Operations and demonstration of cases

ORTHOPEDIC SURGERY

Monday Ifternoon RESEARCH AND EDUCATIONAL HOSPITALS II B THOMAS F W HARR and C N LAMBERT Sym posium Tenodesis Operations and demonstration of cases tendon transplantations

ST LUKES HOSPITAL F A CHANDLER and JOHN R NORCROSS Spondylo-

listhesis aseptic necrosis of the head of the femur

Tuesday Mornine

CHILDREN'S MEMORIAL HOSPITAL F CHANDLER F SEIDLER C PEASE and I NORCROSS Operations and demonstration of cases

COLUMBUS HOSPITAL F H Storr and I E Storr Sciatica

COOK COUNTY HOSPITAL

ARTHUR CONLEY Operations and symposium withdemon stration of cases blind pegging of hip for fracture of neck of Jemur using Airschner wire and Smith Petersen nail problems in diagnosis of bone tumors painful back in medicolegal cases persistent dizziness following head injuries fractures in and about the ankle

MARCUS II HOBART Operation Removal of internal semi lunar cartilage Demonstration of cases Recurrent dislocations of shoulder internal derangement of knee joint spinal fusions, low back pain acquired disloca tions of hip following scarlet fever syndactylism.

PRESBYTERIAN HOSPITAL E | BERKHETSER Dry clinic and demonstration of cases

MICHAEL REESE HOSPITAL

PHILIP LEWIN DANIEL LEVINIHAL, CHARLES PEASE F GLASSMAN SIDNEY SIDEMAN JEROME G FINDER and I Worrs Operations

ST LUKES HOSPITAL

F A CHANDLER and JOHN R. NORCROSS Chordotomy for chono-athetosis spina bifida

> Tuesday Afternoon MOUNT SINAI HOSPITAL

C Jacobs Orthopedic demonstrations
L Mitter Visualization of joints
J FINDER Giant cell tumor of bone
F GLASSMAN Nonumion of neck of femur

ST LUKES HOSPITAL

II A SOFIELD Fracture of the neck of the femur treated by steel pan method of fixation Lantern slides cases W RYERSON Injuries and anomalies of the spine

R O RITTER Fractures and infantile paralysis

WESLEY MEMORIAL HOSPITAL

F M JANSEY, H KELIKIAN and O H HORRALL Bone and joint surgery

Wednesday Morning

LUTHERAN DEACONESS HOSPITAL

Indications for surgical treatment of EMIL VRTIAL arthritis

MUNICIPAL TUBERCULOSIS SANITARIUM

E J BERKHEISER Bone tuberculosis

ST BERNARD'S HOSPITAL

L B DONKLE and M E CREMMITON Fractures of the shaft of the femur

ST LUKE'S HOSPITAL

E W RYERSON and associates Operations

WESLEY MEMORIAL HOSPITAL

PHILIP H KREUSCHER and associates Bone and joint surgery, knee injuries

Wedresday Afternoon EVANSTON HOSPITAL

I L PORTER and R C I ONERGAN Low back disorders

MERCY HOSPITAL

J D CLARIDGE and associates Problems in orthopedic and traumatic surgery

PASSAVANT MEMORIAL HOSPITAL

EMIL HAUSER and associates Surgery of the Luce and foot-demonstration of cases and lantern slides Total tendon transplant for slipping patella, injuries of the external semilunar cartilage, foose body, the result of a semilunar cartilage injury, manipulative correction of deformity tendon transplant as a routine procedure to triple arthrodesis of the paralytic foot, reconstruction operation for hallux valgus

PRESBYTERIAN HOSPITAL

E I BERKHEISER, KELLOCG SPEED and D RIDER Operations

MICHAEL REESE HOSPITAL

PHILIP LEWIN Fracture problems, new approach for arthrodesis of knee joint, discussion of bone tumors, motion picture demonstration of manipulative surgery SINYEY SIDEMAN Ruce bodies in tendon sheath of the hand, Hole stabilization of the foot, spastic paralysis, roentgenologic library of the hip joint, fusion operation in tuberculosis of the knee joint, busion operation

multiple cartilaginous exostosis DANIEL H LEVITHAL and IRVING WOLIN Tendon trans plantation in poliomyelitis, spastic paralysis, recurrent dislocation of shoulder flat feet, demonstration of arthroplasties of the knee, hip and elbow, knee joint

CHARLES PEASE Acute transverse atrophy of bone, traumatic rupture of intervertebral disc, reduction of compression fracture of spine, osteochondromatosis of the elbows

JEROME G FITDER Chondromyxosarcoma, two cases, flexorplasty of the thumb for paralytic opponens pol licis osteochondroma of the tibia, VicBride bunion plasty, unusual bone tumor (?) of femur, key operation for soft corns, spastic paralysis—bilateral adductor

tenotomy and obturator nerve neurectomy, case with unusual deformities

FRANK GLASSMAN Fracture and dislocation of shoulder, supracondvlar fracture of the humerus, fracture of the neck of the femur, complete fracture of the tibia and fibula, removal of the head of the radius, three cases, osteoma of the femur, demonstration of various types of fractures and treatment

ST ANTHONY DE PADUA HOSPITAL

THOMAS DWYER New bone biopsy trephine, pathological specimens

ST LUKE'S HOSPITAL

II B THOMAS, FRED HARK and CLAUDE LAMBERT Whitman's reconstruction of the hip, good range of motion, Volkmann's contracture, a plea for early treat ment, echinococcus cyst of the os ilium, chronic arthritis joints, arthroplasty

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL

Presentation on Bone and Joint Surgery E L COMPERE Leg lengthening operation, technique and

results, spinal fusion in the correction of scoliosis C H HATCHER The pathology and treatment of tuher-culous arthritis, studies in the rate of skeletal growth

and equalization of lumb length H N HARKINS Bone graft for ununited fracture
P C Bucy and R B Croward Spinal extradural cyst

and its relation to Lyphosis dorsalis juvenilis

C B Huggies Studies in the distribution of red bone

marrow and the reticuloendothelial system in the skeleton

COOK COUNTY HOSPITAL

DANIEL H LEVIVIHAL Bone graft surgery for norunion, stabilization and benign hone tumors. Motion picture demonstration Surgical treatment of spastic paralysis, surgical treatment of residual paralysis following poliomyelitis

PRILIP H KREUSCHER Nicola operation, semilunar car tilage derangement, spinal grafts, new operation for hin

fusion, new operation for Lnee fusion
PHILLP LEWIN Tunnel skin graft over os calcis, spondylo listhesis, stabilization of paralytic varus foot, arthrodesis of ankle joint, hallux varus, tuherculous spine, fusion, infantile paralysis, low back pain with "sciatica" FRANK G MURPHY Skin grafts for old wounds of leg.

unusual bone tumors, fracture into ankle joint, mal union of Colles' fracture, tuberculosis of cunciform bone, scar contracture of forearm, slin graft

ILLINOIS MASONIC HOSPITAL

CHARLES N PEASE and EDCAR WHITE Tuberculosis of the knee, fractures about the elbow in children, reduction of fractures of the spine, traumatic rupture of the intervertebral disc

MICHAEL REESE HOSPITAL

PHILIP LEWIN, DANIEL LEVINTHAL, CHARLES PEASE, F GLASSMAN, I WOLIN, SIDNEY SIDEMAN and SEPOME G FINDER Operations

ST BERNARD'S HOSPITAL

- S L GOVERNALE Pseudomuscular dystrophy, case demonstration I G FROST Metastatic hypernephroid carcinoma of the
- R S WESTLINE and E L ARENSDORF Fractures of the wrist ment

ST LUKES HOSPITAL

F W RYERSON and associates Clinic

ST MARY OF NAZARETH HOSPITAL L CZATA Clinic

VETERANS ADMINISTRATION FACILITY S K LIVINGSTON Operations

Thursday Afternoon

COOK COUNTY HOSPITAL E. J. BERKHEISER. Operations and demonstration of cases.

spondylolisthesis antenor poliomyelitis, arthrodesis and tendon transplantation

PRESBYTERIAN HOSPITAL

E | BERKHEISER and D RIMER Operations RESEARCH AND EDUCATIONAL HOSPITALS

H B THOMAS F W HARR and C N LAMBERT Opera tion Shelving of a congenital dislocated hip Demonstra tion of patients with closed reduction open reduction and shelving of congenital dislocation

VETERANS ADMINISTRATION FACILITY S K LIVINGSTON Symposium Bone tumors

Friday Morning

LUTHERAN DEACONESS HOSPITAL

I MIL VETIAK Indications for surgical treatment of arthritis

PRESBYTERIAN HOSPITAL E J BERKHEISER KELLOGG SPEED and D RIDER Opera

ST BERNARDS HOSPITAL

CHESTER C GUY Surgical pathology of bone tumors VETERANS ADMINISTRATION FACILITY

S K Livrygsron Symposium Maggot treatment of osteomyelitis

Friday Afternoon

ST LUKE'S HOSPITAL

F A CHANDLER and JOHN R NORCROSS Knee fusion giant cell tumor of spine cyst of femur

GENITO-URINARY SURGERY

Monday Isternoon COLUMBUS HOSPITAL

WILLIAM GERL FRANK L CHENOWETH H E DAVIS and I I VOLINT Resectoscope for bladder carcinoma

Tuesday Morning

MOUNT SINAI HOSPITAL

II ROLNICK H SOLOWAY and E HIRSCH. Symposium Tumors of the kidney

PASSAVANT MEMORIAL HOSPITAL L L VESEEN V D LESPINASSE HARRY CULVER 200 FRED LIEBERTHAL Symposium Tuberculosis of the unnary tract

PRESBYTERIAN HOSPITAL HERMAN L KRETSCHMER ROBERT HERBST and associates

Operations MICHAEL REESE HOSPITAL

I KOLL J EISENSTAEDT H ROLNICK I SHAPERO J GROVE F LIEBERTHAL AND A E JONES SYMPOSIUM

Carcinoma of the urmary bladder ST JOSEPH S HOSPITAL

CHARLES M. McKENNA. Undescended testucle

ST MARY OF NAZARETH HOSPITAL I WELFELD Urologic clinic Malignancy of tumors of the bladder in children

WESLEY MEMORIAL HOSPITAL V. D. LESPINASSE and associates. Clinic. Presentation of cases

WOMEN AND CHILDREN'S HOSPITAL Marre ORTHANER and PEARL M STETLER Clinic

Tuesday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS C M McKenna R D Herrold and staff Operations and demonstrations Experimental and climcal studies on various types of unnary antiseptics anomalies with

special reference to undescended testicle and hypospadias ST ANTHONY DE PADUA HOSPITAL O I IIRSA Prostatic management carcinoma of bladder pyclography

Il ednesday Morning

CHICAGO MEMORIAL HOSPITAL I WILLIAM PARKER and JOHN P O NELL Operations

COOK COUNTY HOSPITAL

HARRY CULVER L L VESEEN CHARLES MCKENNA and HARRY ROLYICK Operations

GARFIELD PARK HOSPITAL VINCENT J O CONOR C C SAELHOF and associates More

recent advances in infections in the urinary tract. MERC' HOSPITAL

II E LANDES Symposium Transurethral resection

J E LAIBE and associates Kidney anomalies treatment
of neoplasms of the urinary tract.

MUNICIPAL TUBERCULOSIS SANITARIUM DORRIN RUDNICK Tuberculosis of the urinary tract PRESBYTERIAN HOSPITAL

HERMAN L KRETSCHMER ROBERT HERBST and associates. Operations

MICHAEL REESE HOSPITAL

I KOLL, J EISENSTAEDT H ROLNICK I SHAPIRO J
GROVE F LIEBERTHAL and A E JONES OPERATIONS

Wednesday Afternoon

CHICAGO MEMORIAL HOSPITAL

J WILLIAM PARKER, JOHN P O VEIL, E J STIEGLITZ, D G BRUNJES, OTTO SAPHIR and GEORGE M LANDAU

Symposium Kidney infections

1 L Weinstein, J William Parker and John P
O'Neil Transurethral resection of the prostate

R A MELENDY, I WILLIAM PARKER, JOHN P O NELL and OTTO SAPHIR Tuberculosis of unnary tract in males

EVANSTON HOSPITAL

I I FARRELL Undescended testicles

ST ANNE'S HOSPITAL

HARRY J DOOLEY Urologual chinic, demonstrations ST BERNARD S HOSPITAL

ANDREY SULLYA! Operations

ST ELIZABETH'S HOSPITAL

T G McDougatt Carcinoma of the bladder

Thursday Morning

CHILDREN'S MEMORIAL HOSPITAL HERMAN L KRETSCHMER and K BARBER Operations

COOK COUNTY HOSPITAL

HARPY CULVER and CHARLES MCKEVNA Symposium Chronic bladder neck obstructions in the male

ILLINOIS MASONIC HOSPITAL

EDWARD W WHITE ROBERT H HAYES and JOHN H
GILMORE Renal tuberculosis Avenues of transmission, discussion of the pathogenesis and morbidity, primary foci and complicating factors in relation to general tuberculosis, roentgenological aspects, concerning pro static rescution

CLARENCE C SAELHOY and JOHN H GILMORE CARCINOMA of bladder-diagnosis, type of treatment and approach, result and cases, renal calcult-multiple stone in redupli cated pelvis diagnosis treatment by heminephrectomy, operative cases, malignancy of prostate gland—diagno sis, method of immediate relief for obstructive symptoms, postoperative radiation therapy and results cases, roentgenological advances in urologic diagnosis

JACKSON PARK HOSPITAL

WILLIAM YOVAER Transurethral prostatic resection com pared to other types of prostatic surgers

PRESBYTERIAN HOSPITAL

HERMAN L KRETSCHMER, ROBERT HERBST and associates Operations

MICHAEL REESE HOSPITAL

I LOLL, J FISENSTAEDT, H ROLNICK, I SHAPIRO, J GROVE, F LIEBERTHAL and A E JONES Operations

ST JOSEPH'S HOSPITAL

CHARLES M McKevva Undescended testicle

ST LUKE'S HOSPITAL

L E SMITH, HARRY CULVER and associates Genito urmary clinic Unnary calcula

VETERANS ADMINISTRATION FACILITY T G McDongall. Carcinoma of the bladder

WASHINGTON BOULEVARD HOSPITAL VINCENT J O'CONOR Plastic on renal pelvis for hy-

dronephrosis, review of various types of hydronephrosis with exhibition of films and pathologic specimens

WESLEY MEMORIAL HOSPITAI

V D LESPINASSE and associates Clinic

Iriday Morning

EVANGELICAL DEACONESS HOSPITAL PAUL MORF Nephrolithotomy

H LINOIS MASOVIC HOSPITAL

C Oris Riren Nephrectomy, transurethral prostatic resection, prological chinic Anomalies of upper urmary tract, bilateral and unilateral complete reduplication of kidneys and ureters, incomplete reduplication of kidneys and ureters, bifid pelves ureteral buds, renal tuberculosis

PRESBITERIAN HOSPITAL

HERMAN L REETSCHUER ROBERT HERBST and associates Dry clinic

VETERANS ADMINISTRATION FACILITY

T G McDougatt Perineal prostatectomy

Days to be Announced

COOK COUNTY HOSPITAL

L L VESEEN and HARRY ROLNICK Symposium Pyo genic infections of the upper urinary tract

THORACIC SURGERY

Monday Afternoon

MUNICIPAL TUBERCULOSIS SANITARIUM Collapse Therapy Chric 23 N Wacker Drive

STAFF Demonstration of collapse therapy measures on ambulatory patients, discussion of indications, results, complications and technique

Tuesday Morning

ALBERT MERPITT BILLINGS HOSPITAL W E Anams and associates Experimental esophageal surgery

COLUMBUS HOSPITAL

R M DAVISON C VOLINI, M JOANNIDES, D ORTH and G MUELLER Symposium on tuberculosis Thoracic surgery, pneumothorax treatment including climato therapy

COOK COUNTY HOSPITAL

JOHN B O'DO OGHUE and ROBERT LEE Treatment of empyema, ward walk and presentation of cases

RESEARCH AND EDUCATIONAL HOSPITALS WILLARD VA . HAZEL Operations with demonstration of cases

ST JOSEPH'S HOSPITAL WILLIAM C BECK Thoracic surgery

VETERANS ADMINISTRATION FACILITY TERRITE R. HEAD New type of thoraconfasts, chest surgery

Tuesday Afternoon

COOK COUNTY HOSPITAL RALPH B BETTMAN Operations

PRESBUTERIAN HOSPITAL IDEN DORSEY Dry clime and demonstration

RESEARCH AND EDUCATIONAL HOSPITALS WILLARD VAN HAZEL and staff Symposium Broncho genic calcinoma

S LEVINSON Pathology

ADOLPH HARTING Roentgenological diagnosis PAUL H HOLINGER Bronchogenic aspects MILLARD VAN HAZEL Surgical consideration demonstra tion of cases and specimens surgical treatment of mediastinal tumors

J WALHOWSKI Roemigenological consideration of mediastinal tumors M JOANNIDES Collapse therapy of pulmonary tubercu losis

Il ednesday Morning

ALBERT MERRITT BILLINGS HOSPITAL W. F. Anans and associates. Intrathoracic neoplasms

EVANSTON HOSPITAL

TEROME R HEAD Indications for lobectoms MUNICIPAL TUBERCULOSIS SANITARIUM

RICHARD DAVISON Thoracoplasty Collapse Therapy Chaic artificial pneumotherax pneumo-Phrenics STATE

pentoneum ST RERNARDS HOSPITAL

R I Drever The rational treatment of empyema dem onstration of cases

S L GOVERNALE and F F Frome Congenital cyst of the hing demonstration of cases

II ednesday Afternoon

MUNICIPAL TUBERCULOSIS SANITARIUM M JOANNES Phrenic surgery intrapleural pneumolysis PRESENTERIAN HOSPITAL

FORN DORSEY Operations

ST LUKE S HOSPITAL

MILLARD VAN HAZEL Chest surgery demonstration of Cases PAUL HOLENGER Bronchogenic aspect of chest surgery

Thursday Morning

ALBERT MERRITT BILLINGS HOSI IT AL W F Anams and associates Operations

HAINOIS MASONIC HOSPITAL

MINAS TOANNIDES Phrenic neurectomy phrenic crush eratematomy artificial pneumoperatoneum elepthorag. Dry chair Eleothorax Indications technique and com plications advantages of artificial pneumoperitoneum as an adjunct to phrenic neurectomy

MUNICIPAL TUBERCULOSIS SANITARIUM RECHARD DAYTSON Thoracoplasty pneumolysis

ST JOSEPH'S HOSPITAL WILLIAM C BECK Thoracic surgery

> Thursday Afternoon COOK COUNTY HOSPITAL

RALPH S BETTHAN Operations PRESBYTERIAN HOSPITAL

IONN DORSEY Operations

MICHAEL REESE HOSPITAL RALPH B BETTMAN and WILLIAM TANVEYBARM Thoracic

surgery ST BERNARD'S HOSPITAL

A R. MOSTGOMERY and R E CHANGES Percenditis with effusion demonstration of case

Friday Morning

ALBERT MERRITT BILLINGS HOSPITAL W. F. Analis and associates. Intrathoracic operations and the cuculation (experimental and case presentation)

MUNICIPAL TUBERCULOSIS SANITARIUM (Collapse Therapy Chaic, 23 N Wacker Drive) Pneumolysis electhorax artificial pneumo-

thorax pneumoperitoneum.

MICHAEL REESE HOSPITAL

RALPH R BETTWAN and WILLIAM TANKENBAUM Thor acoplasty operation MAY RIESENTHAL Surgery of pulmonary tuberculous MAX BIESENTHAL and RALPH B BETTHAN Technique of various operations used for pulmonary tuberculous Artificual pneumothorax pneumolysis thoracoplasty

motion picture and diagrammatic demonstrations
Raipe B BETTHAN Treatment of empyema injuries of the chest presentation of cases motion picture and diagrammatic demonstrations

WOMEN AND CHILDREN'S HOSPITAL

HELEN HAYDEN EMELIA GIRVOTAS MARGARET AUSTIN and NORA B BRANDEVBURG Bronchoscopy in relation to asthma and allied pulmonary conditions lipiodol in rectzon

Friday Afternoon

COOK COUNTY HOSPITAL

JOHN B O DONOCHLE FREDERICK TICE RICHARD JAFFE
M J HOBENY S H ROSENBLUM and A J HAUBY Symposium Pulmonary tuberculosis Iony B O Dovocaue Operations

PRESBY TERIAN HOSPITAL IONN DORSEY Operations

Daily

ST LUKES HOSPITAL PAUL HOLINGER Exhibit

FRACTURES AND TRAUMATIC SURGERY

Monday Afternoon

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and associates Operative fractures

TACKSON PARK HOSPITAL

S W M ROBINSON, C W HENNAN and M J MILLS Traumatic surgery

ST ANTHONY DE PADUA HOSPITAL

Γ W SLOBE Fractures, phases of traumatic surgery

ST LUKE'S HOSPITAL

HART E FISHER Electrical injuries, shock, burns and glare injury to the eyes with their preventive phases, treatment, resuscitation, etc. Evolution of resuscitation showing various methods from ancient time down to the present Manual, mechanical and medical methods
Lantern slide and motion picture demonstration
T HANSON and J JANSEN Treatment of communited
fractures of the leg

Tuesday Morning

CHICAGO MEMORIAL HOSPITAL ARTHUR H CONLEY and S PERRY ROGERS Symposium Blind pegging of fractures of the femur
FRED MILLER, T C BROWNING, EMILE DUVAL and
G M LANDAU Fracture of both bones of lower leg

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and associates Ward walk

ST JOSEPH'S HOSPITAL HUGH Mckenna Demonstration clinic

ST LUKE'S HOSPITAL II E MOCK A R MORROW and C E SHANNON Skull fracture exhibit

WASHINGTON BOULEVARD HOSPITAL ARTHUR R METZ Treatment of unusual fractures

Tuesday Afternoon

CHICAGO MEMORIAL HOSPITAL

C R G FORRESTER, HORACE STIMSON and A H MASON Symposium Fractures, nerve repair

COOK COUNTY HOSPITAL

SUMNER L KOCH and associate Tendon and nerve suturing of the hand, hand infections

ST LUKE'S HOSPITAL

R R DUFF and R R DUFF, JR The use of adhesive plaster in the treatment of burns, simple traction in dislocations of the shoulder, elbow and Colles fracture

VETERANS ADMINISTRATION FACILITY S K LIVINGSTON Dry clinic

Wednesday Morning

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and associates Ward wall. FREDERICA DYAS Ward walk (female)

EVANSTON HOSPITAL

DWIGHT CLARK Fractures about the knee joint

ST ANNE'S HOSPITAL

THOMAS E MEANY Fractures and tendon transplanta

ST BERNARD'S HOSPITAL L B DONKLE and M E CREIGHTON Fractures of the shaft of the femur

ST LUKE'S HOSPITAL

H E Mock, A R Morrow and C F SHANNON Skull fracture exhibit

IOUN D ELLIS Treatment of traumatic back injuries

W ednesday Afternoon

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS, JAMES J CATLAIIAN, CARLO S SCIDERI, FREDERICK DYAS BIRD GEORGE L APPELBACH Symposium knee joint injuries

PASSAVANT MEMORIAL HOSPITAL

PAUL B MAGNUSON and JAMES K STACK Symposium on fractures

ST LUKE'S HOSPITAL C G SHEARON and GRAHAM KERNWEIN Infections of the hand

Thursday Morning COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and associates Ward wall

GARFIELD PARK COMMUNITY HOSPITAL I I CALLADIAN, H N WAIT and MILTON SCHMITT Dem. onstration chinic

JACKSON PARK HOSPITAL ARRIE BAMBERGER Demonstration clinic

ST BERNARD'S HOSPITAL

R S WESTLINE and E L ARENSDORF Fractures of the wrist joint ST JOSEPH'S HOSPITAL

HUGH McKFNNA Demonstration elinic

ST LUKE'S HOSPITAL

H E Mock, A R Morrow and C E Shannon Skull fracture exhibit

H E Mock and associates Hip fracture demonstration WILL LYON Early closure of open wounds

ST MARY OF NAZARETH HOSPITAL L Czaja Symposium Late results of fractures

U S MARINE HOSPITAL

HORACE P STIMSON Ununited fractures with osteo E C LUTTON and R W FLYNN Skeletal traction and

countertraction in treatment of fractures FRANCES E WILLARD HOSPITAL

JAMES A VALENTINE Clinic

Thursday Afternoon

CHICAGO MENORIAL HOSPITAL
ARTHUR H CONLEY and S PERRY ROGERS Blind pegging
of fractures of the femur

G M LANDAU Fracture of both bones of lower feg

COOK COUNTY HOSPITAL
WILLIAM R CUBBINS and associates Operative fractures

GEORGE L APPELBACH Ward walk (female)

JACKSON PARK HOSPITAL

S W M ROBINSON C W Ifennan and M J MIELS Traumatic surgery

FRANCES E WILLARD HOSPITAL
FRED CARLS Clinic

WOMEN AND CHILDREN'S HOSPITAL ARMINA HILL Minor injuries MARY E WILLIAMS Fractures, dislocations

Friday Morning
CHICAGO MEMORIAL HOSPITAL
C R C FORRESTER HORACE STIMSON and A H MASON
Fractures nerve repair

NEUROSURGERY

Monday Afternoon

COOK COUNTY HOSPITAL

H C VORIS and J J KRARNS Intracranial injury—dem
onstration of pathology physiology management surgical interference sequelæe complications

Tuesday Morning

RESEARCH AND EDUCATIONAL HOSPITALS
GEZA DETAKATS Operation Lumber sympathectomy
Symposium Neurocirculatory Diseases

Symposium Neurocirculatory Diseases R Brunner The use of neosynephrine in spinal anestresia

WILLIAM C BECK Selection of cases for sympathectomy demonstration of sympathectomized patients evaluation of results the management of fymphedema F K HICK. Vascular accidents associated with coronary

F K. Hick. Vascular accidents associated with coronary occlusion H C. LUETH Unusual reactions following the use of

nitroglycerine
GEZA DETAKATS The treatment of acute arterial occlu
sion operability of hypertension, demonstration of cases
H L MISHKIN and P J SARMA The treatment of vari

cose veins and ulcers

J T REYNOLDS Amputations in peripheral vascular

disease

Tuesday Afternoon MERCY HOSPITAL

C F SCHALB and H C VORIS Neuro-ophthalmology Presentation of cases with fund perimetric field finding discussion of diagnostic problems presentation and discussion of cases of recurrent papilicdems following cranial explorations and decompressions: COOK COUNTY HOSPITAL
WILLIAM R CUBBINS and associates Follow up clinic
demonstration of cases

demonstration of cases

ST LUKE'S HOSPITAL

H E Mock, A R Morrow and C E Snannov Skull fracture exhibit

Friday Afternoon
COLUMBUS HOSPITAL

F MUELLER Fractures
W L BEECHER Traumatic surgery

COOK COUNTY HOSPITAL

JAMES J CALLAHAN and CARLO S SCUDERI Cadaver
demonstrations

Days to be Announced

COOK COUNTY HOSPITAL

DR GATEBOOD Symposium Fractures in children

HENROTIN HOSPITAL

SURGERY

PRESBYTERIAN HOSPITAL

A VERBRUGGHEN Dry clinic and demonstration

ST LUKES HOSPITAL

ERIC OLDBENO Operation
GEAD DEFARATS Demonstration of late results in patients
following sympathectomy for neurocirculatory disorders
John Coulter Physical therapy in the treatment of
peripheral vascular disease
George R. Fenn The management of the surgical

diabetic
Carl A Jon Son Recognephone in postoperative shock
Richard Carrs The carotid sinus syndrome and its

surgical significance George Scurman Classification in hypertension

.

H ednesday Morning

RESEARCH AND EDUCATIONAL HOSPITALS

Exic Oldberg Operations and demonstration of cases

Wednesday Afternoon

COOK COUNTY HOSPITAL

4 VERBRUGGHEN Surgical paraplegia—etiology, pathology classification physiology, treatment prognosis

PRESBYTERIAN HOSPITAL

4 VERBRUGGHEN Operations

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL

P C Bicv and R B Cloward Spinal extradural cyst
and its relation to kyphosis dorsalis juvenilis

RESEARCH AND EDUCATIONAL HOSPITALS ERIC OLDBERG Operations and demonstration of cases

Thursday Afternoon MERCY HOSPITAL

H C Voris and associates Symposium Management of cerebral gliomas

H C VORIS and H E LANDES Demonstration of choroid plexus resection in hydrocephalus, cytometric studies in neurological lesions

C F SCHAUB and H C VORIS Neuro-ophthalmology Presentation of cases with funds perimetric field find ings, discussion of diagnostic problems, presentation and discussion of cases of recurrent papilledema following cranial explorations and decompressions

PRESBYTERIAN HOSPITAI

A VERBRUGGHEN Operations

MICHAEL REESE HOSPITAL

Symposium Intracranial Suppuration ROY GRINKER Neurological aspects of intracranial sup-

puration
A VERBRUGGHEN Surgical aspects of brain abscess

Friday Afternoon

PASSAVANT MEMORIAL HOSPITAL

LOYAL DAVIS and JOHN MARTIN Neurological surgery Presentation of cases emphasizing diagnosis and treat

PRESBYTERIAN HOSPITAL

A VERBRUGGHEN Operations

ST LUKE'S HOSPITAL ERIC OLDBERG Operation

EXPERIMENTAL SURGERY

Friday Morning

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL.

LEON ARIES Acceleration of bone growth and repair as determined by deposition of dye in the callus (By feeding dogs dyes which are deposited in the callus experimental fractures are studied to determine what substances accelerate bone growth and repair) Lantern slide demonstration

R A Bussabarger, S Freeman and A C Ivv the rôle of the stomach in calcification of bone (Demonstration of gastrectomized puppies showing homogenous osteo porosis This demonstration shows the necessity of ob servance of dietary care in gastrectomized patients)

Lantern slide demonstration FIMER J KOCUR The effect of various foods upon bile secretion with and without return of bile to the gastro intestinal tract (Demonstration of animals This shows the necessity of adequate dietary control of patients with

biliary fistulas) C R SCRMIDT and J M BEAZELL The effect of diet on pancreatic secretion (The results obtained guide the

postoperative care of a patient with duodenal fistula)
WILLIAM BACHRACH and SAMUEL J FOGELSON Common duct transplantation (Demonstration of animal Results obtained show the site of implantation of the common duct is important in preventing subsequent ascend ing infections of the biliary passages)

MICHAEL L MASON and HARVEY S ALLEN Experimental studies on tendon repair (Histologic studies of tendon repair after use of varied suture material, grafts and

different techniques)
LEO M ZIMMERMAN Surgical repair of inguinal hernia
as guided by anatomical studies (A simplification of surgical technique for the treatment of inguinal hernia

after evaluating the anatomy)

JOHN MARTIN The negative effects of midbrain lesions upon the gastric secretion, motility and gastro intestinal ulceration in monkeys and cats A Horsley Clarke ap paratus was used to produce midbrain lesions in cats and monkeys No changes were observed in gastro intestinal function and activity

H CHOR The rational of physical therapy in the treatment of muscle disorders Experimental observations on mas sage, passive movement of electrical stimulation and of rest upon muscle atrophy and regeneration in the lower

motor neuron type of paralysis

MICHAEL REESE HOSPITAL STAFF Demonstration in experimental surgery

Days to be Announced ALBERT MERRITT BILLINGS HOSPITAL

LABORATORY STAFF Demonstration

RESEARCH AND LDUCATIONAL HOSPITALS WARREN H COLE and associates Demonstration

PLASTIC AND FACIOMAXILLARY SURGERY

Monday Afternoon

ILLINOIS EYE AND EAR INFIRMARY SAMUEL SALINGER Facial plastic surgery SIDNEY POLLACK Nasal fractures BERNARD M COHEN Nasal and ear prostheses

Tuesday Morning CHICAGO MEMORIAL HOSPITAL CASPER M EPSTEIN Plastic, faciomaxillary surgery COOK COUNTY HOSPITAL

IOSEPH C SCHAEFER Demonstration of cases showing corrected temporomandibular ankylosis, harelips and cleft palates, pedicle flap and full thickness graft cases, repair of burns, traumatic injuries, plastic repairs of controlled carcinom's cases

ST JOSEPH'S HOSPITAL

WILLIAM H G LOGAN Oral surgery

Tuesday Afternoon PRESBYTERIAN HOSPITAL

FREDERICK MOOREREAD and R. OLISTED Operations

MICHAEL REESE HOSPITAL SAMUEL SALINGER and CASPER EFSTER \assl and facial plastic surgery treatment of injuries to the face.

II ednesday Morning

ST LUKES HOSPITAL H A POTTS and F W MERRIFIELD Demonstration clinic

II ednesday Afternoon

MOUNT SINAI HOSPITAL E Atson and associates Oral surgery

PRESEVTERIAN HOSPITAL

FREDERICK MOOREHEAD and R. OLMSTED Operations

Thursday Morning COOK COUNTY HOSPITAL

IOSEPH E SCHAEFER. Demonstration of cases showing car cinoma of mouth lips and face with colored photographs of lesions before and after radiation.

MICHAEL REESE HOSPITAL CASPER EPSTERN Oral surgery

ST JOSEPH'S HOSPITAL WHITEM H. G LOCAN Oral surgery

Thursday Afternoon

PRESBYTERIAN HOSPITAL FREDERICK MOOREHEAD and R. OLUSTED Dry chine.

> Friday Morning ST LUKES HOSPITAL

H 4 Porrs and F W MERRIFIELD Demonstration

Friday Afternoon CHILDREN'S MEMORIAL HOSPITAL

L W SCHULTZ Dry clinic and demonstration, PRESBYTERIAN HOSPITAL

FREDERICK MOORENEAD and R. OLMSTED Operations, RESEARCH AND EDUCATIONAL HOSPITALS L W Schretz Oral surgery with particular reference to cleft palates and hareling.

Day to be Announced COOK COUNTY HOSPITAL I MESEAT Plastic urgers of the nose and face

PHYSICAL THERAPY

Monday Afternoon COOK COUNTY HOSPITAL DISRAEM ROBAN General physical therapy procedures

NORTHWESTERN UNIVERSITY MEDICAL

SCHOOL JOHN S COULTER and S I OSBURNE. Clinical and experimental investigations of short wave medical disthermy

MICHAEL REESE HOSPITAL

C O MOLANDER. Ward walks physiotheraps methods. Tuesday Morning

COOK COUNTY HOSPITAL DISRAELI KOBAR. In posttraumatic conditions

MUNICIPAL TUBERCULOSIS SANITARIUM IOHN S COULTER and LEO HARDY Ultraviolet radiation in the treatment of gastro-intestinal tuberculosis

> Tuesday Afternoon COOK COUNTY HOSPITAL

I F HUMBON Physical therapy in infantile paralysis. MICHAEL REESE HOSPITAL

S PERLOW and C O MOLANDER. Physical therapy in the treatment of circulatory disturbances.

Il ednesday Morning COOK COUNTY HOSPITAL DISRAELI KOBAR. In postoperative traumatic infections

GARFIELD PARK COMMUNITY HOSPITAL MILTON SCHAFFE Hyperpyrexia in conorrheal arthritis. NORTHWESTERN UNIVERSITY MEDICAL

SCHOOL HERMAN CROR. Rationale of physical theraps in muscle disorders. JOHN S COURTER Demonstration of clinical and experi-

mental results. MICHAEL REESE HOSPITAL FEANE GLASSKAN and C. O MOLANDER. Physical therapy

in the treatment of fractures. Hedresday Afternoon

COOK COUNTY HOSPITAL I F Herence Physical therapy in neurocurrical and neu rological conditions.

GARFIELD PARK COMMUNITY HOSPITAL MELTON G SCHAFTT The value of heating tissues by in duction byperpyrexia.

PASSAVANT MEMORIAL HOSPITAL

J S COULTER Physical therapy in fractures. SUBNER L KOCH VICHAEL L VIASON and J S COULTER. Physical therapy in hand injunes.

MICHAEL REESE HOSPITAL

I WOLL and C O MOLANDER. Physical therapy in the treatment of poliomyelitis.

Sinvey Sinesian and C. O. Molander. Physical therapy in treatment of pastics.

Thursday Morning

COOK COUNTY HOSPITAL

DISRAELI KOBAK Physical therapy in low back conditions
ILLINOIS CENTRAL HOSPITAL
ION'S COULTER Under water exercises in the treatment

JOHN S COULTER Under water exercises in the treatment of fractures of weight bearing bones

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J S COULTER and S L OSBORNE Hyperpyrexia in chronic infectious arthritis

F CHANDLER J R NORCEOSS and J S COULTER Man agement of low back conditions

MICHAEL REESE HOSPITAL

BERT FINNE Hyperpyrexia in the treatment of gonorrheal arthritis

Thursday Afternoon

COOK COUNTY HOSPITAL

I F HUMBION Manipulative treatment in low back con

ditions

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

EMIL HAUSER and J S COULTER The rôle of physical therapy in common disorders of the foot

MICHAEL REESE HOSPITAL

JULIUS GRINKER and C O MOLANDER Physical therapy
in treatment of peripheral nerve injuries

Friday Morning

COOK COUNTY HOSPITAL

DISRAELI KOBAK Physical therapy in bursitis

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J S COULTER Physical therapy in traumatic arthritis

MICHAEL REFSE HOSPITAL

LESTER FRANKENTIAL and C. O. MOLANDER Physical

therapy in treatment of chronic pelvic inflammation

[Friday Afternoon]

COOK COUNTY HOSPITAL

I F HUMMON Physical therapy in the prevention of

deformaties

ST LUKE'S HOSPICAL

JOHN S COULTER Physical therapy in reconstruction surgery

ROENTGENOLOGY

Monday Afternoon
ST LUKE'S HOSPITAL
L L JENKINSON, E W ROBERTS A F HUNTER and W
WASKOW LESIONS OF TERMINAL IEEE

Tuesday Morning

LUTHERAN DEACONESS HOSPITAL

RALPH WILLY Newer concepts in the treatment of carcinoma

ST LUKE'S HOSPITAL

E. L. JENEINSON, E. W. ROBERTS, A. F. HUNTER and W. WASKON. Exhibit of interesting cases, pathology shown by x ray.

ST MARY OF NAZARFTH HOSPITAL
C J CHALLENGER 'X ray studies of surgical conditions

Tuesday Afternoon

ST ANTHONY DE PADUA HOSPITAL

L S TICHY Silicosis demonstration

ST BFRNARD'S HOSPITAL

B C CUSHWAY, R J MAIER and E K Lewis Roentgen therapy of inflammation and infections of the face and neck.

ST LUKE'S HOSPITAL

E L JENKINSON F W ROBERTS, A F HUNTER and W WASKOW Gall bladder visualization following medical treatment.

Wednesday Morning ST LUKE'S HOSPITAL

E L JENEINSON, E W ROBERTS, A F HUNTER and W WASKOW Gall bladder visualization following surgical drainage

Wednesday Afternoon

DAVID S BEILEN Roentgen diagnosis of gastro-intestinal lesions

ALBERT MERRITT BILLINGS HOSPITAL
PAUL C Hodges and associates X ray diagnosis

ST LUKE'S HOSPITAL

E L JENKINSON, E W ROBERTS, A F HUNTER and W WASKOW Interesting bone pathology

Thursday Morning

LUTHERAN DEACONESS HOSPITAL
RALPH WILLY Newer concepts in the treatment of car-

PASSAVANT MEMORIAL HOSPITAL

JAMES T CASE Technical considerations in gastrointestinal radiology, round table discussion on radiation therapy of carcinoma of breast LABL BARIN The evolution of primary tuberculous

LARI BARTH The evolution of primary tuberculous infection of the lungs in roentgenograms, round table discussion on miscellaneous roentgen therapeutic applications.

tract.

EXPOSS.

RESEARCH AND EDUCATIONAL HOSPITALS ADOLPH HARTING Conference on a ray Carnon, with particular reference to bone dystrophy lessess of the urnary tract, beam tumors and urnsmal lessess of the gastro-intestinal tract.

ST LUFE'S HOSPITAL E. L. JENERSON E. W. PORERYS, A. F. HENTER and W.

Wastow Ethilyt of the secting case pathol er shown by z ray

Thursday Afternoon COOK COUNTY HOSPITAL

P TERT F McNarrix High ve are therapy of malig

M J Herry Romirmolomezlerzmasartiologyanda.

MOUNT SINAI HOSPITAL Max Com G Descripts and E Lewis Demonstrations of interwine radial procurated conditions.

ST LUKE'S HOSPITAL

E. L. IENERSON E. W. POSIETS, A. W. HINTER and W. WALEUR Malignancies of lungs.

Friday Morring

ST LUKE'S HOSPITAL E L. IENERSON E W POTENTS A F HUNTER and W Walkow Exhibit of interesting cases path ogy shown DY I IST

Friday Afternoon

AUGUSTANA HOSPITAL Date 5 Person Report Carper, of leaves of contract

COOK COUNTY HOSPITAL

J Part Bessert. Romanourcal entire of the bbes, ertes ad liaite POTENT F McNarray High values demon of male

ST LUKE'S HOSPITAL

E. L. Janeinson, E. R. Roberts, A. F. Heyers and W. BASE OF Earlie of mirrorme cases maddle redown to r nr

Days to be Armouned

HENTOTIN HOSPITAL

Agrees R. Hasses A ray deep restrains. WESLEY MENORIAL HOSPITAL

FRANK L. HELSEY These expression of a national linear משושמלשים שי של השוף יד כל נוצ ובניים לשיום

TUMORS AND IRRADIATION

Monday Afterroom

ST FLIZARETH'S HOSPITAL

I LEAKS. Radium treatment of fractures. VETERANS ADMINISTRATION FACILITY

Tue.day Morring

LUTHERAN DEACONESS HOSPITAL

G. P. Atlanta Regular turner clima

Labore Prior Pathalogy of malament growths in selation to therapeutic indications

MICHAEL REESE HOSPITAL MAX CUTLER, TEROMY F STRAT S and SANTIL PLANE

KAY Radium therapy in malierant terms of the bead and neck demonstration of cases and technique

ST ELIZABETH'S HOSPITAL M. G. Levers. Sarrooma of the turnach

VETERANS ADMINISTRATION FACILITY A. E. Williams. Deep a ray and radium therapy.

Tuesday Afternoon

RAVENSWOOD HOSPITAL

C Buswell, J J Moore, H P Servers and L E Screeners. Cancer clust, presentation of specimens, lantern Judes, cases the training melanomes of honder 22दी प्रश्न

RESEAPCH AND EDUCATIONAL EOSITIUS BRILLED VAN HAVER and wast. Symmourum Lynchy-

S LITTANON PARALLET Lours Harris R. E. reschool Carries LATE H HTERSORE Broad ormer aspects.

BELLED VAN HATTL. Surneal considerative demonstratum of cases and spectron surned training of meda, mai tum m.

T J WARREN Rom , Thomas to made a trong of man artical term on

M. JOHNSON Colleges therapt of polymers toleraloc.

Hedreday Morrey

ALBEPT MERRITT BILLINGS HOSPITAL Presentation on Tumor Supervi

L Brevers Experimental production of famors and the effects of Coley's tone in the treatment of eigenmen...! sartoma pallapare treatment of priminers metastases from mallament tumors la e rest... in trea ment of branch gain call tamors of bone.

D B Properties and a sociales. Stories in the enance dames and treatment of hone tumors.

HARWELL WILSON Extra beletal ossivers tomore

VETERANS ADMINISTRATION FACILITY

Max Corner. Amount times done Presentation of career cases, endurances, technique and results of rate

thereon. G R. AHAMEN, Diagnosis and treatment.

Thursday Morning

COLUMBUS HOSPITAL

D A ORTH M HANNAY and H E DAVIS Breast cancer

LUTHERAN DEACONESS HOSPITAI

ISADORF PILOT Pathology of malignant growths in relation to therapeutic indications

MFRCY HOSPITAL

W I Pickerr Unusual cases of malignancy

MICHAEL REESE HOSPITAL

Max Cutler and staff Results of radiation treatment of cancer of mouth tonsil pharyny and larynx, presenta tion of cases Radiation treatment of cancer of the breast, presentation of cases Motion pictures illustrating technique of radium treatment of cancer of mouth and cancer of cervix. Transillumination of breast

ST ELIZABETH'S HOSPITAL

LEO M ZIMMERMAN Mediastinal tumors

VFTERANS ADMINISTRATION FACILITY A E WILLIAMS Inspection of deep x ray and radium therapy unit

WESLEY MEMORIAL HOSPITAL

GUY S VAN ALSTYNE Carcinoma of the breast, combined surgical and x ray treatment

Thursday Afternoon

PASSAVANT MEMORIAL HOSPITAL MAX CUTLER The organization of a tumor clinic Personnel, equipment records follow up

Carcinoma of the Breast

JOHN A WOLFER Surgical considerations JAMES T CASE Fre and postoperative x ray radiation L M Ross THAL Radium treatment MAJOR GREENE Branchingenic tumors of the neck JOHN F DELPH and EARL BARTH Carcinoma of the

larynx hypopharynx and tonsil JOHN MOHARDT A survey of some proposed cancer cures

RESEARCH AND EDUCATIONAL HOSPITALS Symposium Diseases of the Gastro Intestinal Tract GEORGE MILLES Pathology of carcinoma of stomach W H COLE Total gastrectomy

T I WACHOWSKI X ray diagnosis of carcinoma of stomach

C L Birch Anemia associated with total gastrectomy
M H Stredener Diagnosis of carcinoma of the rectum
C B Puestow Surgical treatment of carcinoma of the rectum

BERNARD PORTIS Surgical treatment of complicated duodenal ulcers

F L McUtlan Regional ileitis
J L SPIVACE Tubovalvular stoma with particular refer ence to gastrostomy II O WERNICKE The injection treatment of hernias

Friday Morning

MFRC1 HOSPITAL

HEVRY L. SCHMITZ and associates Symposium Radi ologic therapy of malignancy

RESEARCH AND EDUCATIONAL HOSPITALS R B MALCOLM Operations Neck dissection, carcinoma

of breast, surgical pathology of breast tumors

T J Wachowski X ray treatment of carcinoma of breast ARRIE BAMBERGER LWING tumor with case report

ST BERNARD'S HOSPITAL CHESTER C GUY Surgical pathology of bone tumors

ST LUKE'S HOSPITAL

H E Mock William Brown E W Ryerson E F Hirsch and E L Jenkinson Tumor clinic Demon stration of pathology, diagnosis, treatment of malignan cies of the breast and collar bone

VETERANS ADMINISTRATION I ACILITY G R ALLABEN Regular tumor clinic

WESLEY MEMORIAL HOSPITAL EARL LATIMER Unusual breast tumors

Friday Afternoon

PRESBYTERIAN HOSPITAL CARL APPELBACH and F Source Dry clinic

Day to be Announced

HENROTIN HOSPITAL SAMUEL LEVINSON Surgical pathology

OPHTHALMOLOGY

Monday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL
A C Kracse Fundus diagnosis

CHILDRE'S MEMORIAL HOSPITAL

G GUIBOR, Orthoptics.

COOK COUNTY HOSPITAL

E B Fowler Fundus diagnostic clinic.

ILLINOIS EYE AND EAR INFIRMARY
R VON DER HEYDT Operation for glaucoma and cataract.
DWIGHT C ORCUTT Dry clune

MERCY HOSPITAL

C F SCHACE F I BARNETT and E A ROLLING Fundus
chance

MICHAEL REESE HOSPITAL
PHILIP HARPER Orthoptics

RUSH MEDICAL COLLEGE

DR HOLMES Orthoptics

Tuesday Morning

VORTHWESTERN UNIVERSITY MEDICAL SCHOOL
GEORGE GUIBOR Orthoptic training classification of

SANTORD R GIFFORD Concomitant and paralytic squint RUSH MEDICAL COLLEGE

DR WILBER Histopathology

DR Wilses Histopathology

Tuesday Afternoon
ALBERT MERRITT BILLINGS HOSPITAL

C V DEVNEY Orthoptics
COLUMBUS HOSPITAL

COLUMBUS HOSPITAL
M Goldenburg Eye clinic

COOK COUNTY HOSPITAL
C F Yerger Medical ophthalmology

ILLINOIS EYE AND EAR INFIRMARY
THOMAS D ALLEN Operation for glaucoms and cataract
LOUIS HOFFMAN and E. K. Fronky Dry clinics.

MERCY HOSPITAL

C F SCHAUB and H C VORS Neuro-ophthalmology*
Presentation of cases with funds, permetire field findings discussion of diagnostic problems presentation and discussion of cases of recurrent papilledema following cranial explorations and decompressions.

MOUNT SINAI HOSPITAL

J LEBENSOHN and E SELENGER Clinic.
MICHAEL REESE HOSPITAL

T M SHAPIRA Fundus dinic

RUSH MEDICAL COLLEGE
Dr Jacobson Fundus clinic.

II ednesday Morning
COOK COUNTY HOSPITAL

SANFORD R GIFFORD Retinal detachment.

RUSH MEDICAL COLLEGE
W F Moncrette Cataract.

Wednesday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

S S BLANKSTEIN End results of retinal detachment operations

CHILDREN'S MEMORIAL HOSPITAL

R. C. GAMBLE and E. A. VORISEK, Diagnostic clinic.

ILLINOIS ENE AND EAR INFIRMARN
DWIGHT CORCUTT Operation for glaucoma and cataract.
S J MYPER. Retinal detachment.
E H CRIPICA Orthoptics.

MERCY HOSPITAL

C F Schare F I Barnett and E A Roung Fundus
chaic.

MICHAEL REESE HOSPITAL

S J MEYER and D SNYDACKER Retinal detachment clinic

U S MARINE HOSPITAL
ALFRED MICREAY Eve injuries.

Thursday Morning
ILLINOIS MASONIC HOSPITAL

Alla Sowers Cataract extraction employing Elschnig technique discussion of dinatrophenol cataracts—treat ment, results.

Thursday Afternoon
ALBERT MERRITT BILLINGS HOSPITAL
L BORBAN Maculai divesse

COLUMBUS HOSPITAL

M Gothenburg Eye clinic

COOK COUNTY HOSPITAL

E B Fowler. Fundus clinic.

ILLINOIS EVE AND EAR INFIRMARY

E K Franka and Louis Horeway Operation for

glaucoma and cataract.
Thowas D Arres Glaucoma.

MERCI HOSPITAL

C F SCHATE and H C VORES Neuro-ophthalmology Pre-entation of cases with fund permettre feld end mgs diagnostic problems pre-entation and discussion of cases of recurrent papilledems following cranial explorations and decompressions.

MICHAEL RELSE HOSPITAL

LACK COWAN Glaucoma clusic.

Friday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

Dr. McShelinan Cataract results.

CHILDREN'S MEMORIAL HOSPITAL R O RISER Diagnostic clinic

ILLINOIS EYL AND EAR INFIRMARY S I MEYER Operation for glaucoma and cataract R VON DER HEYDT Slit lamp demonstration

RUSH MEDICAL COLLEGE

E Springer Medical ophthalmology

Days to be Announced COLUMBUS HOSPITAL

M GOTDENBURG Glaucoma clinic

HENROTIN HOSPITAL

GEORGE W MAHOVEY, F A ROLING and IRVING BAR NETT Eye climic

OTOLARYNGOLOGY

Monday Afternoon COOK COUNTY HOSPITAL

NORMAN LESHIN Pneumonography Interesting cases with methods of examination and diagnosis

SAMUEL PEARLMAN Carcinoma of the larynx, bronchos copy, esophagoscopy

ILLINOIS EYE AND EAR INFIRMARY SAMUEL SALINGER, SIDNEY POLLACK and BERNARD M

COHEN Nasal plastic surgery, demonstration of nose and ear prosthesis Symposium Intracranial Otogenic Complications M GLATT Petrositis

JACOB LIPSCHUTZ Brain abscess
C H CHRISTOPH Lateral sinus thrombosis

SAMUEL SALINGER Facial plastic surgery, presentation of cases

RESEARCH AND I DUCATIONAL HOSPITALS OLIVER E VAN ALYEA Surgical anatomy of the nasal

MANUEL G SPIESMAN Diseases of the phirynx Sylvio A Sciarfita Conservative treatment of chronic suppurative otitis media

RUSH MEDICAL COLLEGE

Louis T Curry and Frank Worntak Sulfanilamide in the treatment of meningitis

> Tuesday Morning HENROTIN HOSPITAL

M REESE GUTTMAN Malignant diseases of the head and neck with special reference to the larynx

MOUNT SINAI HOSPITAL JOSEPH C BECK, ALFRED LEWY, JACOB LIFSCHUIZ S M

MORNITZ, FRANCIS L. LEDERER, M. R. GUTTMAN and associates Clinics

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

I F DELPH, A H ANDREWS and GLEVY I GREEVWOOD Technique of endobronchial aspiration T P O'CONNOR Nasopharyngitis

MARION A ANDREEN Results of different reading methods for raising the temperature of the antrum GLENN J GREENWOOD Audiometric readings in allergy II C BALLENGER Audiometric testing I F DELPH Benign tumors of the vocal cords

MICHAFL REESE HOSPITAL

MAX CUTLER, JEROME E STRAUSS and SAMUEL PEARL MAY Radium therapy in malignant tumors of the head and neck, demonstration of cases and technique

ST JOSEPH'S HOSPITAL

AUSTIN A HAYDEN Conservation of hearing, mastoid and sinus surgery Tuesday Afternoon

COOK COUNTY HOSPITAL

JACOB LIFSCHUTZ Demonstration climic

MICHALL REDSE HOSPITAL SAMUEL SALINGER and CASPER EPSTEIN Nasal and facial

plastic surgery, treatment of injuries to the face RESEARCH AND EDUCATIONAL HOSPITALS

FRANCIS LEDERER Ear, nose and throat plastic surgery Paul H Holinger Diseases of the larynx RUSH MEDICAL COLLEGE

CLMER HAGENS and PAUL CAMPBELL Pathology of the petrous bone in cases dying of meningitis, lantern slides

ST MARY OF NAZARETH HOSPITAL J J LILLEEN Mastorditis in children

> Wednesday Morning MOUNT SINAL HOSPITAL

JOSEPH C BECK, ALFRED LEWY, JACOB LIPSCHUTZ, S M MORWITZ, FRANCIS LEDERER, M R GUTTMAN and associates Clinics

ST ELIZABETH'S HOSPITAL F A DULAK Ozena

Il ednesday Afternoon RESEARCH AND EDUCATIONAL HOSPITALS J THEOBALD Complications of middle ear infections SHERMAN L SHAPIRO Neuro otology DR PELOUZE Deep neck infections

RUSH MEDICAL COLLLGE

THOMAS W LEWIS and RICHARD WATKINS Causative factors and results of treatment of vasomotor rhinitis with foreign protein

ST ANNE'S HOSPITAL

JERRY HAYDEN Ear, nose and throat clinic HARRI M PETERSON Surgical demonstration and clinic

> Thursday Morning MERCY HOSPITAL

HERRERT NASH and R KERWIN Anatomy and physiology

of nose and accessory sinuses
The Proetz method of visualization showing pictures and demonstration of method

G J Musgrave Ferris Smith operation
C H CHRISTOPH Maxillary sinuses intranasal radical
C T Torday Caldwell Luc operation

MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIPSCHUTZ S M MORWITZ, FRANCIS LEDERER M R GUTTHAN and associates Choics

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

L B AREY B J ANSON J GORDON Wilson and associates Reconstruction of tonsils stapes petrous bone J G Wilson and B J ANSON Reconstruction of bone methology agrees of destines.

G WISON and B J ANSON Reconstruction of bone pathology in cases of deafness. Motion Pictures of Vestibular Reaction J F DELPH Simplified calone tests GGRDON WILSON Spontaneous mystagenes in lesions

of the brain
E L Ross Toxic reactions in animals

ST JOSEPH S HOSPITAL
AUSTRA HAYDEN Conservation of hearing mastoid and

sinus surgery
Thursday Afternoon

COOK COUNTY HOSPITAL

NORMAN LESHIN Pneumonography Interesting cases
with methods of examination and diagnosis
SAUDEL PRABLIAN CARRINOM of the largual bronchos

copy esophagoscopy
RESEARCH AND EDUCATIONAL HOSPITALS

ARTHAN H FOR and JOHN W HARNER JR Rhinologic surgery allergy in relation to otolarymgology FRANCIS LERERGE and N T PATTENGALE Cancer of the ear nose and throat

RUSH MEDICAL COLLEGE

GEORGE E SHAMBAUGH JR and I INTON WALLNER The treatment of deafness

Friday Morning
COOK COUNTY HOSPITYL
JACOB I SESCRUTZ Demonstration clima

EVANGELICAL DEACONESS HOSPITAL

JOHN M BICK Submucous resection and tonsillectomy

MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIF CHITZ S VI MORWITZ FRANCIS LEDERER VI R GUTTMAN and associates Clinics

Freday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS
A R HOLLENDER Physical therapeutic methods

W THEOBALD Nasal accessory linus disease PAUL H HOLLIGER Bronchoscopy and esophagoscopy

RUSH MEDICAL COLLEGE

DANIEL B HANDEN and E L CHAINERT Conditions producing timulus evaluation of methods of treatment

Days to be Announced BILLINGS MEMORIAL HOSPITAL

J R LINDSAL Petrositis septic otitis and lateral inus thrombosis

CHILDRE'S MEMORIAL HOSPITAL

GEORGE LIVINGSTON PAUL HOLFINGER and associates.

Intracranial complications of ear infections bronchoscopy in children, endoscopic ca. es.

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I MESSAT Flastic surgery of the nove and face

S PRASSIAN Diseases of the neck and larynx including
laryngoscopy and bronchoscopy.

L CUERY Mastochits and meningitis
A LEWY The mastoid and the labyrinth
T C GALLOWAY and H E DAVIS Selective treatment in
malignancy about the head

ILLINOIS EVE AND EAR INFIRMARY

ALFRED LEWY Chronic suppurative outils media

JOHN CANANAGES Chronic sinusitis diagnosis and surgical treatment.

SURGERY

GYNECOLOGY AND OBSTETRICS

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SOME ASPECTS OF MALIGNANT TUMORS OF THE KIDNEY

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T IS a great pleasure to take part in this meeting to do honor to the memory of ouroldfriend, Dr B A Thomas, who was logical surgery. I have selected for my theme, a discussion of malignant tumors of the kidney, and while it is impossible to cover the entire field in this brief address, I will present a collection of interesting experiences in the diagnosis and treatment of kidney neoplasms, dealing especially with tumors arising in the parenchyma, in the nucosa of the cally x and of the pelvis, and in the ureter

ORIGIN AND PATHOLOGY

There are definite varieties of tumors involving the kidney, depending upon their origin. The most common tumors in adults are the hypernephroid carcinomas, originally described by Gravitz, which develop from the cortex, whereas in the young, and occasionally in adults, one encounters the mixed tumors, usually called Wilms tumors. In addition, in adults, rarely in children, one sees papillary, henign and malignant tumors, arising from pelvic and calyceal mucosa. Although a great deal of work has been done

on the origin of so called malagnant (and bengn) Grawitz tumors, usually called hypernephromas (Birsch Hirschfeld), which are clear celled carenomas and resemble in many

B \ Thomas Oration presented before the Philadelphia. Urological Society January 25, 1937

respects similar tumors arising from the cortex of the adrenal, it is still in doubt whether these tumors arise from the kidney parenchy ma or from adrenal rests Many of these tumors in gross look like lipomas before extensive degeneration takes place, and appeared in the medical literature as lipomas, angiosarcomas, peritheliomas and the like, before Gravitz suggested their origin from adrenal rests. In view of the great frequency of occurrence of adrenal rests along the spermatic and ovarian veins, as well as in the kidney and liver, it would be surprising if adrenal rests give rise to these tumors in the kidney, as similar tumors are not frequently found in other locations, where adrenal rests have been known to occur In fact, this reasoning, which I presented to Oscar Stoerck some 32 years ago while working in the Pathological Institute of the Allgemeine Krankenhaus in Vienna, led him to review the whole situation I had noted in the study of 150 livers obtained at autopsy that just below or in Glisson's capsule in the right lobe of the liver there was an incidence of 6 adrenal rests, or 4 per cent Schmorl had previously found similar adrenal rests in the liver in the same location Another worker in Vienna, Wiesl, had found rests in over 90 per cent of autopsy cases, situated along the spermatic and ovarian veins, in the broad ligament, and even in the tunica vaginalis testes Professor Marchand had suggested that these adrenal rests might develop into tumors, thus supporting Grawitz s original contention that the large, fatty looking vascular tumors, occurring in the lidney cortex, were derived from these rests

A priori one would have expected similar bypernephroid tumors from other adrenal rests. The fact that they have rarely occurred only a few cases having been described, seemed to confirm my doubts and fortify O-car Stoerck's opinion based on micro-copic studies, that these turoors in the kidney, known as Grawitz tumors clear cell carcinomas. hypernephroid in type, were denied from cells of the kidney parenchyma as Weichselbaum and Greenish, as well as Zudeck, had previously contended. It must be evident that although logic, as well as some micro scopic criteria, seems to point away from the origin of these turnors from adrenal rests the final decision will be reached only by biochemical studies. It is interesting to relate that a Philadelphian, A Croftan, in Virchow's Archir in the beginning of this century, was the first one to apply biochemical tests to these tumors. He found that extracts of these tumors produced glyco-una, much like ex tracts from the adrenal and he also found a dennite iodine reaction, which be described at the same time. My attempt to confirm this

was unsatisfactory In the meanwhile, L Pick made the unusual observation in a case of bypernephroid tumor that not only was the cortex, but the medulla, of the adrenal recognizable in the tumor This to date is a unique observation. Years ago, still interested in the problem of the on gin of these tumors I asked Dr Braasch to have extracts made from the tumors at Roch ester, to see whether Dr Kendall could ex tract from the hypernephroid tumors the cor tin, which is usually extracted from the adrenal cortex. According to his report published within the last year, the laborators at the Mayo Chnic has been unable to extract cortin from these growths up to date

In 1927 Tscheboksarow and Melkin pub lished a study of adrenal lipase which was extracted from human and animal adrenal glands and was highly sensitive to chloral hydrate Sub-equently in proved cases of adrenal disease they identified this same lipase in patients sera. Joins (10,3) confirmed this is case of Addison's disease and applied these stalagmometric methods to a sense of hypernephroid tumors and in a sense of 8 Grawitz lading tumors, the serum of the patients in 6 gave positive adrenal lipase reactions, and the extracts of all 8 tumors gave the identical reaction, leading him to conclude that this specine lipase is given off to the serum by the tumors and demonstrates their origin from adrenal rests in the kidner. This remarkable study as far as I know, has not been confirmed as yet.

It has been known for some years that tu mors of the adrenal cortex may produce a hormonal disturbance leading to premature sexual development, masculinization and hirsutism. If these bepernephroid tumors were of adrenal, cortical ongin one might expect similar disturbances, but as far as I know no such changes have been noted. It is just possible that only one of the layers of the cover may produce such hormonal effects and the bypernephroid growths do not arise from this particular layer.

The ab-olute decision as to the origin of these tumors must still remain undecided, although the pathological micro-copic anat omy frequently suggests the same structure as the carcinomas of the adrenal, denved from the adrenal cortex, and the microscop c grouping of the cells mitnics those of the zone 125qualata (and reticulatae) of the adrenal, these are not absolute evidence against a possible ongon from the renal parenchyma. It is con cervable that our difficulties in extracting cor tin from these tumors may have been due to the fact that the cortex of the adrenal, has ing 3 lavers of different cells, all 3 of which may not produce corun and as adrenal rests may contain only the fasciculate (and reticulatæ) layers the mability to recover cortin in these hypernephroid tumors is explicable

In addition to these bypernephroid tumory, the name actually implying that they are of adrenal rest origin, one finds definite, nonfatty looking types of carcinoma with typical microscopic picture and cells not comparable with these found in the Grawitz tumors.

without necessarily invalidating their possible

one in from adrenal rests.



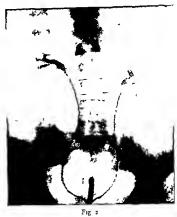


Fig 1



Fig 3



Figs 1, 2, 3, and 4 Pyelograms of hypernephromas showing marked deformity of pelvis and calyces

Such types of carcinoma infiltrate the kidney parenchyma and do not produce the huge nodular growths, or Grawitz tumors, that are a much more frequent finding. Both types of neoplasms may invade the vascular



Fig. 3. I selogram of a large upper pole tumor on the left sade closely simulating by palpation an enlarged spleen with a definite notch palpable directly under the abdominal wall below the level of the navel. The pelvis is pushed far down into the iliac fossa.

channels though the hypernephroid tumor does so much more frequently, both may invade adjacent lymph glands, but these are much more likely to be involved in the true. non hypernephroid carcinomas Very rarely one encounters a completely encapsulated hypernephroid tumor, which is spheroidal located in the cortex and shows no invasive characteristics and no particular evidence of proliferative activities Some have looked upon these as benign hypernephromas and they resemble closely the tumors originating from adrenal rests outside of the Lidney, the so called strumæ suprarenales aberratæ, along the spermatic or ovarian veins, or in the broad hgament

The mixed, or Wilms tumors, which also produce large renal tumors, are seen mainly in children and are very malignant. That their malignancy is not always the same is evidenced by the fact that every once in a while



Fig. 6. 4 similar case. In each case it is interesting to note that interpersonal organs can displace retrogen toneal organs. I have seen a large spleen diplacing the left kindry toward the size costs and after I had done a splenectory the kindry returned almost to its normal posters. Those or Continents of Madrid had the posters of the proper of the splene is the size of the right kindry was displaced across the spine to the left and after taking care of the hydatid cyst the exerctory use gram showed the return of the right kindry from the left lumbar gutter to the right take.

one encounters one of these enormous mixed tumors in adults. Such tumors are made up of derivatives of the 3 layers of the embryo, and on section are recognized as congenit mixed neoplasms. Although these tumors are the usual and most frequent type of tumor in children, every once in a while one encounters a hypernephroid neoplasm in the young. In view of these variations in the milignancy of the mixed tumors as well as in view of the possibility that one is dealing with a byper nephroid tumor in a child, one is naturally justified in attempting a removal of such a kidney irrespective of the size of the tumor.pref earthly after pre operative roentgen therapy

The papillary tumors arising in the Lidney pelvis, calvoes and ureter at times associated



Fig. 7 Pyelogram of a papillary carcinoma of the lower pole of the kidney, simulating clots filling the kidney pelvis, which, however, could not be washed out

with lithiasis, present an entirely different group of cases and rarely grow to the size of the hypernephroid or Wilms tumors. The pathology of these tumors is somewhat similar to those tumors that occur in the bladder nuccosa, and have a tendency to make implants along the ureter and at the bladder ostium of the ureter, as well as over different parts of the bladder nuccosa. They may be benign or malignant, and the earlier they are recognized, the more effectively they are dealt with Rarely these growths may be squamous cell epitheliomas and not papillary.

Metastases along the ureter in the Grawitz hypernephromas, in the true renal carcinomas, and in the Wilms tumors are most exceptional, while in the group just described, they are sufficiently frequent to demand an aseptic nephro-ureterectomy with excision or destruction of the ureteral meatus in the bladder Unless such a complete procedure is carned out at the original operation, a second or third operation may be required to remove im-



Fig. 8. An excretory urogram of a large Wilms tumor in a child showing compression of the pelvis and calyces

plants in the ureter, as well as implants in the bladder

Late metastases in hypernephroid tumors are not infrequent, and solitary distant metastases may be the first evidence of disease of the Lidney After nephrectomy, even with. complete removal of the pennephric fat, all too often a local recurrence manifests itself shortly following the operation or some years later, and deep roentgen therapy does not prevent or control such recurrences Distant metastases to the adrenals, bones, liver, kidney, lungs, brain, and occasionally to most unusual sites, may also appear early or very late, 7 to 10 or more years following the nephrectomy These late metastases are often solitary and unfortunately we do not know just what biological forces delay the develop ment of these secondary tumors They surely must have been deposited (if solitary) prior to the nephrectomy, but some forces in the patient's body hold them in check for many years until finally they become clinically evi-



Fig. 0. Yretrograde pyelogram of a patient with hyper nephroma the size of a baseball. Owing to the resilience of the tissue pyelographic picture shows practically normal pelvis and calyceal system except for slight dilatation of the upper calyx.

dent Probably similar forces delay the local recurrences in the wound in those cases in which years elapse before a local mass becomes evident A knowledge and understand ing of these forces would be of in valuable aid in fighting malignant growths of other types and other organs, as the phenomenon is not entirely unique to hypernephroid, renal tumors

Metastases have also been known to regress and disappear, probably completely, without any therapy. Multiple metastases developed in the previously clear lung of one of my patients. Some months following operation, this patient developed a cough, and a mentigen picture was taken by the same radiologist, who found multiple large and small metastases in the lungs. Another picture about 5 months later by the same radiologist showed the lungs clear and the cough bad disappeared. Another case of adrenal carcinoma similar to the above bypernephroid kidney tumor, in which

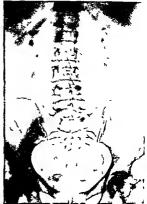


Fig 10 An excretory urogram of the same patient showing typical picture diagnostic in every way of compressing hypemephroma

the multiple deposits in the lungs disappeared has been seen by me in recent years. This peculiar phenomenon of disappearance of metastases is probably closely related to that previously touched upon, and some of our laboratory efforts should be directed toward finding the biological forces that keep local recurrences and solitary distant metastases in temporary check, as well as the similar forces that cause metastases, such as have been seen in the lungs by a few other observers and our selves, and have been found to disappear completely

RENAL VEIN TUMOR THROMBOSES AND IN-VOLVEMENT OF THE INFERIOR VENA CAVA

Perbaps the best evidence of the delay in the recognition and treatment of the largest group of these malignant kidney tumors, the hypernephroid type, is to be found in the incidence of involvement of the renal vens



showing irregular filling and distention of the calyx

in the nephrectomized patients H Leiter reviewed 130 nephrectomies performed on my service for kidney malignancies and the pathological report showed that 50 patients had tumor thrombi in the main renal veins Of these. 8 extended into the inferior vena cava Naturally such extensions materially affect the prognosis Despite such involvement of the renal veins, if one can remove the kidney and involved vein in one piece without forcing metastases into the circulation, one may occasionally eradicate the whole disease and effect a cure In a few cases such tumor thrombi bave been removed successfully from the cava and the patients have lived 5 to 14 years. when recorded, without further neoplastic disease being evident

Recent studies have suggested that involvement of the renal veins may be recognized in the pre operative study, although in general no definite diagnostic symptoms are produced by these renal vein or caval obstructions. During the last few years, in using excretory urography, it bas been noted that a certain number of tumor cases fail to visualize on the side of the growth. The kidney shadow may show a



Fig 12 Pyelogram showing irregular density in the moderately distended pelis, due to papilloma of the pelvis In addition, the patient had a tiny papilloma at the corre sponding irreter ostium, which helped clarify the interpretation of the pyelogram. This is a positive print which shows more clearly than did the negative the mottled appearance of the kidney pelvis.

slight increase in density, but the calyces and pelvis show no traces of the excreted material At first the reason for this seemed to be readily found in the more or less extensive destruction of the Lidney and the compression of the calyceal and pelvic structures Further study on a fair number of cases, however, failed to corroborate completely first impressions, and it hecame more and more evident that this failure to excrete and to visualize was associated often with renal vein tumor thromboses or perhaps, in rare cases, obstruction and compression of the venous system at the kidney hilus by unusually large or adjacently placed neoplasms In reviewing 16 cases in which there was renal vein involvement, we found that 8 of these failed to visualize, whereas in 22 cases where the renal veins were empty, only 2 failed to visualize Whether in the latter group this non-visualization phenome-



Fig. 13. Pyelo-ram with filling defect in the pelvis due to a large unic acid stone

non was due to more or less compression of the nedicle or torsion of it, cannot be said, as the possible correct interpretation of the nonvisualization dawned upon me only about 12 months ago and such possibilities as direct compression or torsion were not noted in our records. It would, therefore seem that before operation one is justified, in the absence of visualization in suspecting a renal vein in volvement At operation, the vascularity of the perirenal fat immediately suggests a disturbance in the renal return flow and the perirenal veins are practically regularly dilated and engorged when there is thrombosts of the renal veins or compression of them by the size of the growth or distortion of the pedicle

The operative technique in such cases of renal ven thromboses should be associated with as little trauma as possible. We have found that section of the fuerter, followed by exposure of the vascular pedicle, so that it can be carefully and gradually palpated to confirm the diagnosis, should be the first steps. Having recognized that the venion or veins are solid with tumor tissue a heavy chromic gut ligature is passed under the veni and so tied as to include all the other vascular structures in the pedicle. This part of the pedicle is sectioned, thus leaving the ledges haveing on its



Fig 14 Pyelogram in which the whole upper pole of the kidney failed to vilualize as the calyceal system was completely blocked by unnumerable und acid stones in the stenoved calyceal neck

thrombosed vein, which can readily be followed to the entry in the vena cava and ligated between the thrombus end and the cava be fore cutting across the renal vein at an unin volved site. By this technique, the tumor is removed in tolo in the kidney vein specimen. A. Hyman has found that some of these patients have fived for 14 years following the operation apparently perfectly well.

If, on following such a thrombosed renal vem, exposed in the manner described, it is found that the thrombus protrudes into the cava, it may be possible gently to milk it back into the large renal vein and apply the ligature beyond it. In other caves, in which the involvement in the cava is more exten sive, one had better cut across the renal vein after the vena caval wall is grasped and get the kidney out of the way. Then one can incise the cava using moderate pressure of a



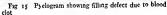


Fig 16 A large retroperatoneal tumor displaces the urcter

sponge on a long forceps below the entrance of the renal vem and gradually milk out the thrombus through an incision in the cava at the insertion of the renal vem, which really enlarges the orifice of this vem. If the intraunious thrombus is too adherent to be milked down to the incision, it may have to be scooped or pulled out. In one case, I introduced my index finger apparently into the right auricle and delivered large pieces of growth that I had not reckeded with the forceps. This particular patient was alive more than 2 years after this rather daring procedure, with a local recurrence in the lumbar gutter.

There is usually very little alarming bleeding, and the opening in the cava is readily closed with a few ordinary thin, plain catgut sutures. The suture line is compressed a few minutes until all evidence of ooze is cootrolled. It has been suggested that in those caval thrombi that invade the vein wall the latter should be resected. I have never attempted such a procedure, and am inclined to question its advisability, as almost all such cases are probably doomed and too much surgery may bring discredit to our art and science

PYELOGRAPHIC DATA

The introduction of opaque media by retrograde injection almost always helps in confirming the diagnosis Unfortunately it is usually late in the disease and though confirmation is valuable, we cannot rely on pyelography to discern with any regularity early tumors, nor can we expect to pick up small, growing tumors frequently by repeated exploratory retrograde pyelograms Pyelography frequently is the only absolutely diagnostic aid in a given case, though occasionally, induced traumatic bleeding, caused by manipulating the catheter and study of the imbedded cell washings, may assist in diagnosis Retrograde pyelography is our greatest aid. The bizarre distortions, intrusions, dilatations, tractions



Fig 17 Retrograde pyelogram showing distention of upper pole of the kidney with displacement downward

on calyces and pelvis, are well known to all, but when they are of modest size and dimen sions may be of doubtful interpretation. As the retrograde injection fills the organ under a certain degree of pressure, if flexibility is still present one may push a solid growth aside and rarely obtain a perfectly normal looking retrograde picture To control such possibilities and to corroborate our studies we regularly do an intravenous excretory uro gram first This helps to locate the disease to rule out symmetrical renal disease, such as polycystic kidneys, and may call attention to typical deformities caused by a good sized neoplasm that cannot be seen in a retrograde pyelogram

Non-opaque stones in the pelvis or calyces may produce hematuna and the filling defects in the pyelogram may cause difficulty in diagnosis. Multiple was bougies, preferably using flevible whale bone bougies capped with a was bulb, have helped us in excluding such une acid stones. Blood clots may also cause suspicious filling defects. Repeated irrigations and repeated pyelographic studies may alone clarify the picture. Solitary cortical cysts,

carbuncles in the cortex, pressure from adjacent retroperitoneal masses, as in various alrenal tumors, or retroperitoneal sarcomas or hematomas may cause pyelographic deformities that baffle our interpretation. Perirenal insufflation by demonstrating the extrarenal tumors may clarify some of these cases. A careful history may do that for others, but at times only an exploratory operation will definitely establish the correct diagrossis.

Some of these kidney tumors masquerade as py onephroses and as calculous disease and one must be watchful not to be led astray by roentgen and by py elographic data which may suggest such pathology. When the patient comes to surgery one should always have in mind the possibility of a complicating neo plasm

OPERATIVE TECHNIQUE

Nephrectomy, naturally, alone satisfies the indications. In the papillary type, nepbro ureterectomy is the operation of choice As one gets more experience in this operative field, one is likely to do a nephrectomy, while at an earlier stage one would have done only an explorator, operation and closed the wound, saying that the case was inoperable. The more expenenced viewpoint, however, can be justi fied by the fact that every once in a while such a nephrectomy may cure, may prevent local distress and pain, and may control severe bleeding with obstruction of the bladder with clots and other complications resulting from leaving the growth in situ A Hyman calls attention to this change in procedure rather graphically In 1027 in our series of 77 pa tients, operated upon, there were o explora tory operations and 68 nephrectomies, where as in the next 58 adult cases, there were 56 nephrectomies and only 2 exploratory opera tions With this change in viewpoint, our immediate postoperative mortality has nearly doubled Whereas some years ago our mortal ity in nephrectomy for malignant kidney tumors was 74 per cent, according to A Hyman's recent analysis of our series of 150 nephrectomies our mortality was 106 per cent Of these, the transpentoneal nephrec tomies had a mortality of 15 per cent and the lumbar nephrectomies 10 per cent plus



Fig 18 Insufflation of the perirenal space shows Ge rota s fascia lower part of cavity being filled by the Lidney and the upper, under the diaphragm, showing air around the large pheochromocytoma or paragan, loma

The approach to the very large tumors is best obtained transpentoneally, as there is less trauma in delivering the tumor, the lumbar space being more limited The theoretical advantage thought to inhere in the transperitoneal approach of early ligation of the vascular pedicle, experience does not altogether confirm If a transperitoneal approach, through a long, mid rectus vertical incision, is made and the colon is mobilized by cutting the posterior parietal peritoneum, one comes down directly on the large tumor mass, but usually it covers the vascular pedicle so that this cannot be visualized. After doubly ligating the ureter, one can palpate the renal vessels and as the kidney is displaced laterally in its lumbar position, one can at times pass the finger under the vascular pedicle, feeling the aorta behind the finger, and then before lifting the



Fig 19 Oblique view of same case as in Figure 18

kidney out of its bed pass a beavy pedicle ligature about the vascular pedicle and tie it at the very beginning of the operation Then after sectioning the pedicle beyond the ligature one can mobilize and deliver the kidney without danger of squeezing tumor cells into the circulation When this is feasible it is the ideal procedure. Otherwise one must, after section of the ureter, deliver the kidney, until one reaches the vascular pedicle, and then ligate it under vision, much as one must do in the lumbar approach The engorged penrenal veins bleed less in the transperitoneal approach, as one has the kidney out and its vessels controlled earlier than in the lumbar approach

Most kidney tumors are removed by us through an enlarged lumbar incision, without rish resection, and depending on the renal vein involvement, the care of the vascular pedicle



Fig 20 Retrograde pyelogram showing moderate by dronephrosis

varies Here also early section of the ureter makes for easier delivery of the organ and one must not be alarmed by the engorged veins which can be pushed aside and their bleeding controlled by rapid delivery of the kidney. After disposing of the kidney, the perirenal fat should be removed. Frequently both the hypernephroid carcinomas and the typical carcinomas have perforated the kidney capsule and involved adjacent areas. After removal of all evidently diseased perinephric ussues, including involved peritoneum, it is advisable to soak the depths of the wound with so per cent alcohol pads to assist in de stroying any local impliants.

In the papillary growths of the Jadney, as well as in tumors of the ureter, after ligating the vascular pedicle one should liberate the ureter without opening it down into the pelvs, below the line vessels, and then through a low rectus muscle incision, the freed ureter should be identified and followed to the bladder There it can be cut away with its ureter open ing in this viscus, or it can be ligated close to the bladder and its lower intramural half inch can be electrocoagulated through the lumen as suggested by Colston If cystoscopy shows a normal ostium, I have usually cystoscopi cally electrocoagulated the intramural part and then at operation tied the ureter as it enters the bladder If the ostium is involved and cannot be controlled by electrocoagula tion through the cystoscope I have excised a cuff of bladder surrounding the ureteral ostium The lower end of the cut ureter is then covered with a sterile cot, firmly tied in place, and the Lidney, with its whole ureter intact with attached finger cot, is lifted out of the lum bar wound, allowing of no spilling at any time during the operation

END RESULTS

Despite all our efforts to diagnose and to cure these kidney neoplasms, our end results are far from satisfactory

In the Wilms tumors, 5 year cures are most exceptional, and in our series we have only one adult who had a Wilms tumor and who has marned, had children, and is well after 21 years In children, almost all died within a few years of the 17 cases of nephretromy collected by A Hyman, 1 child has survived 6

In the adult hypernephroid and carcinoma cases, our experience is much the same as in most chines, and as late recurrences occur, one cannot speak of cures. According to A. Hy man's analysis, approximately half of those surviving the 3 year period succumbed before the end of 5 years. Apparently 34 per cent of our nephrectomized patients who survived operation were alive and apparently well after 5 years.

This sad outlook for patients with kidney tumors can be improved only by earlier diag noss and better appreciation by the profession and laity of the significance of hematuria, lumbar pains, etc., and earlier recourse to simple excretory urography, which will point the clinican in the right direction. I feel sure his will lead to better end results in all large sense of cases, as patients are certain to be brought

to the operating room at a period in their disease much nearer to its beginning than at the

present time

The accompanying pyelograms are presented to show some of the diagnostic problems incountered in working up these kidney neo plasms. We have not included a long series to demonstrate the bizarre pictures produced by hypernephroid carcinoma and other carcinomas of the kidney, but for purposes of comparison, we present a number of pyelo grams which illustrate the deformities produced by this type in adults and by the Wilms type in children

Under differential diagnosis, one must con sider numerous local pathological conditions, which give more or less similar pyelographic pictures. Fortunately polycystic lidneys are usually bilateral, and though their bizarre pyelographic pictures often mimic tumors of the kidney, excretory urography or retrograde pyelography will usually rule out this condition. Solitary cyst of the kidney is usually easily differentiated pyelographically, as one can see not only the contour of the round cyst, but the deformity is more likely to be localized.

in one or more calyces

On the other hand, non opaque stones, unc acid in character, usually in the pelvis, produce definite filling defects, and simulate intrapelvic tumors or intracalyceal tumors at times. These can usually be excluded by passing wax bougies and obtaining definite scratch marks. Figure 13 shows a pyelogram with filling defect in the pelvis, due to large unc acid (non opaque) stone. Figure 14 shows a pyelogram in which the whole upper pole of the kidney fails to visualize, the calyceal system being completely blocked by innumerable unc acid stones in the stenosed caly ceal neck, reaching into the calyces of the upper pole.

Another pathological condution which may interfere with the pyelographic interpretation is the presence of blood clots in the pelvis or ureter. As the patient has been bleeding, in such a case as well as in the uric acid stone cases, the clinical picture is very suggestive of a neoplasm. To exclude these blood dot filling defects, regular irrigation of the pelvis and ureter, with frequent control pyelograms, will usually clarify the diagnosis, the blood clot



Fig 21 Definite filling defect in lower third of ureter, caused by papillary carcinoma of the ureter

being washed out and a normal uretero-pyelogram being obtained Figure 15 shows such a filling defect, due to blood clot

Figure 16 shows a large retroperstoneal tumor displacing the ureter Frequently these tumors are difficult to recognize In this particular patient, the huge retroperstoneal tumor displaced the kidney upward, compressing the pelvic and calyceal structures and pushing the ureter to the opposite side of the spine, so that it was impossible to decide whether one was dealing with a tumor of the lower pole or an extrarenal tumor.

Figures 17, 18, and 19 illustrate again how an extrarenal tumor may compress part of the call ceal system and give the impression of an intrarenal growth distorting this system. By perirenal insufflation it becomes possible to outline the kidney and demonstrate, as in this case, a large adrenal tumor, which compressed the upper pole and deformed the upper call-

ces In Figure 17 the retrograde pyelograms shows the distention of the upper pole of the kidney withdisplacement downward In Figure 18 insuffiction of the perirenal space shows Gerota's fasca, lower part of the cavity being filled by the kidney and the upper, under the haphragm, showing air around the large pheochromocy toma or paraganglioma Figure 19 shows an oblique view of the same case, with the same relationship of the adrenal tumor to the kidney, with air under Gerota's fasca;

Figure 20 is a pvelogram, retrograde, showing a moderate hydronephrous which seem to be trapped as none of the opaque medium has come out alongside of the catheter into the ureter. This patient had been subjected to stretching more than a dozen times for a ureter als stricture, and operation had been advised for infected hydronephrosis. Complete study of the case, as shown in the uretergrain, Figure 21, shows dehinte filling defect in the lower third of the ureter, caused by a papillary carcinoma of the ureter, from which active bleeding took place at this examination, the patient never having bled prior to this examination,

nation The ladner and ureter were removed in one piece, as the ureter was fixed at the site of the tumor. To avoid tearing into the lumen, one long incision was made, so as to get free exposure and complete removal of the ureter down to the bladder.

Note —Bearing on the lack of visualization in the recontegeograms of the kidness during exercity urographs, the following case published in the Journal of the Hount Sinai Hospital 1937, 3 242 is of particular interest

This fends on part of age had billered hypersphonous with hiddered read your throubsect. On November 12 and sent throubsect. On November 12 and sent throubsect. On November 12 caps; cytiscowery showed good indiscussmos exerction from the right kidney in a municia, and fair independent of the continue exerction from the left kidney in a municia, and fair independent of the continue to the continu

This remarkable case of non visualization on either side with normal blood urea and good indigocarmine exerction on both sides seems to be a confirmation of our previous ob ervations incorporated in this article

GASTROSCOPIC OBSERVATIONS OF THE POSTOPERATIVE STOMACH

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PERATIVE procedures that are ordinarily performed upon the stomach for the relief of gastric or duodenal ulcer or the removal of carcinoma are often followed, sooner or later, by unfortunate consequences, the exact nature of which has not always been clear The use of the flexible gastroscope offers the possibility of determining precisely the condition which is giving rise to such recurrent symptoms Since this instrument has been developed and used, our knowledge of the exact morphological changes which are occurring in the stomach which is giving either a recurrence of symptoms similar to those experienced before the operation, some variations of them, or an entirely new set of complaints, has increased With this information we are able to reclassify the more common conditions which cause those who have been operated upon to renew their gastric complaints

In addition to the recognition of recurrence of ulcer or malignancy, formation of new ulcers (gastric, duodenal, jejunal, or stomal) and the presence of unabsorbed suture material, we may add gastrits of these, fistulas and at times ulcers and recurrent malignancy may be diagnosed by x-ray methods, but gastrits can be seen only with the gastroscope

The gastritis which is seen in the stomachs of many patients who have had gastro-enterostomics or some type of resection with jejunal anastomosis was first clearly defined by Schindler The types of gastritis are described as being in general similar to primary gastritis of the stomach, that is to say—superficial catarrhal, atrophic, and hypertrophic changes But in addition, all of these changes are often seen in the same stomach in various degrees, so that Schindler has more recently decided that there must be a classi-

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fication of "gastntis of postoperative stomachs"

It was Schindler who first pointed out that if the operatively produced opening did not rhythmically contract, gastritis was a consequence Others (1, 2, 3, 4, 5, 6) have confirmed this statement All of these gastroscopists have at various times made observations which may be summarized somewhat as follows Whenever the stoma is too large or too small or poorly placed, changes in the gastrie mucosa are likely to occur Gastritis of various degrees is more commonly found following gastro enterostomy than after any of the various methods of resection, and after gastro-enterostomy done for duodenal rather than for gastrie ulcers Most observers have described the hypertrophic form of gastritis with gastro enterostomy and the atrophic form with resections, Schindler does not entirely agree Stomal or jejunal uleers are seldom or never seen in stomachs resected for malignancy The more severe grades of gastritis occurring with a poorly functioning gastro-enterostomy seldom heal

As to the reasons for the changes seen in some cases following operation, most of the workers suggest that, since a gastro enterostomy, or even a resection, is a mechanical expedient only and not a physiological one, any slight deviation from a nearly normal physiological function of the stoma leads to dire consequences That is, if the new opening in the stomach performs badly enough to allow not only regurgitation of upper intestinal secretions and contents into the stomach (which all of them do), but retention of these substances, an aggravation of the mucosa is initiated which may result in profound changes A partial explanation for the effectiveness of gastro enterostomy in relieving symptoms of ulcer and causing healing is that the inflowing alkaline substance from the intestinal segment neutralizes gastric



Fig 1 Case 4 (astro-enterostom) opening with in durated upper edge and hemorrhagic spot on proximal edge



Fig 2 Case 4 Ulcerative gastritis with active ulcer at the site of the hemorrhagic area which was noted 1 month before



Fig 3 Case 11 Gastro-enterostoms—patent not con tracting The proximal edge is thickened and with superficial ulcers



Fig. 4. Case 12. Large ga. tro-enterostomy (right) separated from antrum (left) by high thick ridge. Jejunum shows more red than u ual some granular change noted



Fig 3 Case 13 Gastro-enterostomy on the posterior wall of the antrum. The gastric mucosa shows atrophic changes. There are inflammatory changes in the jejunum.



Fig 6 Case 14 Double barrelled ga.tro-enterostoms The jepunum shows inflammation—it appears darker and redder than normal.

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acidity This may be true for gastric ulcer, less evidently so for duodenal, but it is a nice question just how much of this reflux is sufficient for a benign result, and how much more may produce damage on its own account The other part of the explanation, dealing with the sidetracking of the ingesta by a gastro-enterostomy, or perbaps simply hastening its progress from the stomach, may be helpful for duodenal ulcer, probably less so for gastric, but obviously this purpose may be defeated and actual augmentation of retention occur if the stoma cannot accomplish either of these events. It is certain that the atrophic gastritis seen in cases of gastroenterostomy done for ulcer is a consequence of the operation, it is inconceivable that atrophy was present at the time of operation, such a condition being incompatible with Probably the edematous, superficial, catarrhal gastritis with congestion and hemorrhage surrounding many gastro-enterostomy openings is the preliminary stage of a subsequent completely atrophic condition atrophic changes seen after partial resections of the stomach for malignancy might well have been present previous to operation, and persisted thereafter, possibly in an aggravated form Although hypertrophic changes. even the more severe grades of hemorrhagic. erosive, and ulcerative gastritis, occasionally seen might well have resulted from a poorly functioning gastro enterostomy, such a condition could have been present before opera-That is to say, the condition for which the patient was operated upon may not have been ulcer, but chronic bypertropbic gastritis Symptoms of the two conditions are often similar, and an x-ray film may show the only one of the numerous ulcers and erosions actually present which is deep enough or in such a situation as to cause a defect in the barium outline For this reason it is advisable to examine gastroscopically all patients before operation

Stomal ulcers are much more readily seen by the gastroscope than by x-ray Often they are only erosions which will not produce any defect in the roentgen outline Usually the stoma is surrounded by hyperrigation, scar tissue, contractions, and such other distor-

tions that interpretation of the irregularities of roentgen silhouette are notoriously difficult Jejunal ulcers are obviously less casily seen with the gastroscope, although the condition of the mucosa may usually be estimated In the stomach which has been resected for malignancy, the determination of recurrence is very difficult by roentgen methods. Such stomachs are distorted both by sear and perigastric adhesions The mucosa is thrown into unusually distorted folds, so that the silhouette looks, even in the negative cases, very irregular. Unless the recurrent lesion is quite gross, mistakes are frequent. By the gastroscope, bowever, one is able to distinguish the normal from the abnormal effects and state with a fair degree of certainty the exact condition, whether normal, gastritic, or malignant

Roentgen methods are indispensable in evaluating degrees of retention, the amount of reflux, the presence of the so-called "vicious cycle" and, in fact, all matters pertaining to mothly—about which function gastroscopy indicates little Fistulas of various kinds, ulceration in the jejunal loop beyond the vision of the gastroscope, and the condition of the duodenum itself, if it remains, are all better seen by the x-ray As a matter of fact, in studying postoperative conditions, as in all other gastro investigation, the x-ray and the gastroscope are adjunctive methods, both are necessary

It is sometimes possible to presume from the postoperative history what the condition may be When no relief at all has been expenenced following operation, either the original ulcer has not healed, or the condition was gastritis and not ulcer in the first place. When the symptoms recur soon after operation, either the original ulcer has become active again or a new ulcer of the stomach, duodenum, jejunum, or stoma has occurred. If there is a new ulcer of the duodenum or stomach, the history is identical with that preceding the operation. If the history is similar, but the location of pain and particularly the maximum pain point has changed—

usually to the left instead of to the right of the

midline and lower down-jejunal or stomal

ulcer may be assumed Symptoms occurring

late after operation, usually years, are set up by gastritis usually from the operation. The story of diarrhea indicating too large a stoma too near the greater curvature, or a fistula to the colon, is well known.

Most gastroscopists advocate the taking down of a gastro enterostomy if gastrits of any considerable degree is found. Henning seems not so sure of the efficacy of this procedure, although admitting that any attempt at other management is pallititive and not curative. If the gastritis is well established and advanced, even taking down the gastro enterostomy may not result in complete healing, but it should prevent further progress of the disease.

The following patients were examined gastroscopically because of the presence of symptoms (except Case of and in all of them some condition was found to explain the complaints or abnormalities noted by viray examination.

CASE t No 64106 Male aged 77 years with complaint of vomiting \ ray diagnosis chronic hypertrophic pylone stenosis No free hydrochloric acid in gastric secretion

Gastroscopy carned out February 20, 1936 re vealed a generalized atrophic gastrins funnel like antrum with small pin point, immobile pylorus There is a small pearly, millet seed projection on the pylorus sphincter—the exact nature of which was undetermined

Operation was performed March 4 1936 Gastine resection was done. The sections examined micro scopically showed some hypertrophy of the pylone musculature. The sections from the body of the stomach were poor being badly torn, but an atrophy of the mucosa could be seen whether inflammatory or not was indeterminable. Nothing like the tiny pylone, 'seed noted gastroscopically could be identified. (Note this may have been a fleck of barium saturated mucus.)

Roentgen examination after operation showed a non functioning opening in a resected stomach

Gastroscopy carried out May 22 1936 showed a small stomath pouch with a good sized stoma at the distal part on the posterior wall. The proving degot fins stoma appeared edematous and puckered Surrounding the opening was superficial catarrial gastrints with a few submucous hemorrhage spots. The other parts of the stomach showed atrophic changes as before operation.

CASE 2 No 670037 Male, aged 50 years has had an x ray diagnosis of gastritis but he has no symptoms. He had a perforated gastrie ilcer-closed many years ago. Gastroscopy was carried out February 20 1936, and showed on the anterior

wall of the stomach a slit or deep crevasse sur rounded by high coarse redundant folds puckered toward the defect, but no inflammatory changes were revealed

The x ray diagnosis of gastritis was made undoubtedly because of the hyperrugation consequent upon the scarring at site of closure of perforation

Case 3 No 627011 Male, aged 46 years A diagnosis of duodenal ulcer had been made, for which a gastro enterostomy was done in 1918 Because of recurrent hemorrhages, in 1935 a re section was done leaving the original gastro enterostomy opening but symptoms, principally hemorrhagic persisted and in 1016 a further re section was done, this time the old gastro-enteros tomy being taken down and a new opening being made Gastroscopy was carried out March 6 1936 The gastric cavity was small The distal part showed hyperrugation probably scar contracture at the site of resection. The extreme distal part, on the greater curvature had a round crater like appear ance with a ridge of mucous membrane sur rounding it. The area looked like an ulcer crater except that it was so even and the floor was dark The mucosa showed generalized hypertrophic gas tritis On the posterior wall an open stoma was seen surrounded by coarse hypertrophic rugæ

Gastroscopy was carried out December 20, 1936, and showed again a small stomach cavity with generalized hypertrophic changes of the mucosa. The stoma was seen on the postenor wall near the greater curvature, without any puckering of the

mucosa but with an even edge

CASE 4 No 54578 Male aged 63 sears, had a chinical diagnosis of perforated ulcer 20 tests ago and 3 years later a gastro enterostomy was done Roentgenogram now showed a well functioning gastro enterostomy, but 5 per cent retention and a

very short lesser curvature

Gastroscopy was carried out March 25, 1056, and showed a small pylorus in the normal postion and contracting normally. A gastro enterostomy opening in the posterior wall of the antrum showed occasional contracture. On the proximal lip there was a submucosal hemorrhage crosson. The distalled was rather thick. There was a generalized properties and the state of the submucous hemorrhage cares, and near it scar of old healed ulceration. Gee Fig 1?

Gastroscopy was again carried out April 24, 1936 The gastro enterostomy opening seemed to be more actively contracting than before The submucous erosion on the opening was now only a pigment spot. The submucous hemorrhage area preferred to the submucous hemorrhage area preferred to the submucous hemorrhage to the subm

From the gastroscopic findings it would seem that this was a case of hypertrophic ulcerative gastritis from the beginning

CASE 5 No 624,553 Female, aged 37 years, had a chronic duodenal ulcer Gastro enterostomy was done some years ago. It is now supposed to be a gastric ulcer, gastrojejunal ulcer, or recurrent duo denal ulcer She has had repeated hemorrhages

Gastroscopy was performed April 24, 1936, and showed an extreme hook shaped stomach, so could not see presumed site of gastro enterostomy on the posterior wall of the antrum beyond angulus, the angulus heing too deep The pylorus itself was normal The antrum, that part of it which could be seen, was normal except for a single polyp on "floor" The mucosa everywhere was normal, so presumably the gastro enterostomy (if present) was functioning well

This case illustrates the difficulty encountered in this type of stomach in visualizing the lesser curvature and posterior wall of antrum beyond the deep fold of the angulus

CASE 6 No 625024 Female, aged 50 years The history showed migraine, 1920, cholecystectomy, 1926, resection for cancer of the stomach, 1927, radium application for squamous cell cancer of the cervis, 1935 January 1936, roentgenogram showed the stoma in the resected stomach functioning well No mention of any recurrence

Gastroscopy was carried out April 29, 1936, and revealed a small distorted stomach. The resected end with rather small stoma was seen bidden in the deep mucosal folds The wall of the stomach was everywhere involved in malignant change-pearly white, nodular appearance

Patient died with pneumonia May 2, 1936

CASE 7 No 633,377 Male, aged 58 years Gastric resection for cancer of the pylorus was performed December 18, 1014 In April, 1036. roentgenogram showed defect on the lesser curva

Gastroscopy was carried out April 27, 1936, and showed a small distorted stomach. The stoma was seen at the distal end contracting well, sometimes opening widely so that the jejunum could be visualized The mucosa was generally atrophic through out On the anterior wall toward the lesser curva ture was a nodular elevation, greyish white on top, characteristic of malignancy

This patient died August 4, 1936

Case 8 No 617,528 Female, aged 44 years A gastro enterostomy bad been made 20 years ago She was operated upon again in 1928 at which time cholecystectomy was performed and "something was done to stomach"

Gastroscopy was carried out July 24, 1936, and revealed a very small stomach. The pylorus was not seen, nor anything that could be identified as antrum which bad probably been resected There was a very large opening into the jejunum on the anterior wall, mar the greater curvature, which was separated on the proximal side from the stomach proper by a very thick, edematous ridge or fold of the stomach wall The distal part of the opening could not be plainly made out, but seemed to shade off into a deep crevasse. The mucosa everywhere was pale, thick, granular, edematous The jejunum also showed evidences of inflammation

From the location and size of this opening, one would suppose that there was at the same time too rapid emptying of gastric contents, and considerable reflux

CASE o No 651,382 Male, aged 47 years Patient had had a gastric operation for ulcer The roentgenogram showed a well functioning gastroenterostomy

Gastroscopy was carried out August 21, 1936, 2 days after barium examination and vision was partially obscured by the barium which remained in the stomach. The pylorus was not identified, but the gastro enterostomy opening was seen on the posterior vall of the antrum The mucosa looked normal Gastroscopy should be repeated after the barrum bas been eliminated

This case indicates the necessity of waiting 3 or 4 days after barrum has been used before doing gastroscopy

Case to No 647,568 Female, aged 50 years Gastro enterostomy had been done 18 years ago She has pain at 3 oo a m and 7 oo p m

Gastroscopy was carried out August 21, 1036 A very large gastro enterestomy opening was noted on the posterior wall of the antrum. The iciunum was visualized and was normal in appearance. The mucosa of stomach was everywhere normal. The symptoms in this case may he caused by a recurrence of the duodenal ulcer, or a too rapid emptying because the stoma is so large
Case II No 11,764 Female, aged 44 years

Gastro enterostomy had heen done for duodenal ulcer, to years before She has lately had "ulcer"

symptoms recur

Gastroscopy was done April 9, 1936 The pylorus was seen to he normal and contracting normally The gastro enterostomy opening was located on the posterior wall of the antrum some little distance from the pylorus The opening was quite large and did not contract The proximal edge was thicl , apparently edematous, and had two small greenish erosions No ulcerations of jejunum were seen (See rig 3)

This patient was not examined by x-ray. but it is doubtful whether these small crosions could have been seen in thick edge of stoma

CASE 12 No 25 817 Male aged 42 years Gastro enterostomy was done so years before for perforated duodenal ulcer

Gastroscopy was performed September, 1936 The antrum appeared to be shrunken and was m active. The gastro enterostomy opening was located on the posterior wall of the antrum and was sepa rated by a deep ridge or fold from the anirum proper The opening itself was very large The jejunum could be seen and showed some granular change The proximal edge of the gastro enterostomy shaded off into the gastric mucosa The body of the stomach showed granular change with some exudate and a few small hemorrhages (See Fig 4)

CASE 13 No 57,036 Female, aged 44 years Gastro enterostomy was done 12 years ago for duo denal ulcer The roentgenogram shows practically

non functioning gastro enterostomy

Gastroscopy was carned out October 23 1936 The gastro enterostomy opening was located on the posterior wall of the antrum rather high up near the lesser curvature. The stoma was small and did not contract The edges were thin and rigid jejunum seen through the opening showed inflam matory change The pylorus was out of normal The antrum showed granular gastritis most marked around the stoma with some atrophic change also The hody of the stomach showed mixed granular and atrophic changes with some areas of suhmucosal hemorrhage (See Fig 5)

This gastro enterostomy was taken down At the time of operation, the conditions were found as represented The opening was small and fixed, the jejunal loop was kinked up at the site of the opening. No indications of supposed previous duodenal ulcer were seen It was for this reason that the stoma was closed and the original natural conditions were restored

CASE 14 No 40 671 Female aged 38 years Gastro enterostomy was done September, 1933, for chronic duodenal ulcer with obstruction In October,

1936 patient had hemorrhage

Gastroscopy was done November 17 1936 The pylorus seemed normal. The antrum showed some patches of adherent mucus The gastro enterestomy opening on the posterior wall of antrum was double barrelled with a wide septum. The jejunal mucosa was distinctly hemorrhagic, especially that seen through the proximal opening. The body of the stomach showed some superficial gastritis and an occasional hemorrhagic spot (See Fig 6)

In the absence of any lesion in the stomach which looked as though it had been responsible for the hemorrhage and the definite evi dence of jejunal inflammation of hemorrhagic type, the assumption was that the hemorrhage

came from jejunitis, probably ulcerative in character

CASE 15 No 617,850 Male aged 27 years Gastro enterostomy was done in June, 1935, for per foraling ulcer Roentgenogram now shows poorly functioning gastro enterostomy and to per cent

Gastroscopy was done December 2, 1936, and revealed a pylorus somewhat out of position, the antrum narrowed The gastro enterostomy opening was far down on the greater curvature about the region of the angulus-a poor place The body of the stomach showed a thickened congested mucosa with excess mucus and secretions The stomach was very intolerant to air

In this case it is rather obvious that the gastro enterostomy, on account of its poor position, is responsible for the gastritis present

CONCLUSIONS

Gastroscopy offers the only opportunity of seeing directly such changes in the gastric mucosa as are likely to result from a poorly functioning opening placed in the stomach as part of some operative procedure upon it These changes include various types and degrees of gastritis and ulceration, and recur rence of malignancy

Because of the similarity of symptoms and often of roentgen findings between peptic ulcer and chronic hypertrophic gastritis, it is suggested that gastroscopy should always be done in such cases before operation

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BLOOD PRESSURE IN SKIN CAPILLARIES AND SURGICAL SHOCK

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TOR many years much attention has been directed toward the effect of surgical operations on the buman organism Many questions still remain unanswered concerning the response of the individual organs and concerning the physical and chemical changes occurring in the hody fluids brought about by the trauma of opera-The effect of surgical operations on blood pressure is well known (Koenig) our investigations we have been able to confirm the premise that blood pressure invariably falls after operation, especially after extensive manipulations of the mesentery and the peritoneum. The type of anesthesia and the extent of the operation are most important factors involved in the production of a fall in hlood pressure My own investigations, which were carried out in collaboration with Findeisen, concerned the effect of operations upon the vegetative nervous system and have caused me to note particularly changes in capillary pressure

Blood pressure in the arteries and in the capillaries is regulated by different bemodynamic mechanisms When vasomotors are mentioned, the artenomotors are generally thought of (Krogh), on the other hand, our ideas as to the co-ordinated but rather independent capillariomotor system, however, are more sketchy in spite of the fact that in surgery the importance of the latter is by no means less than that of the former changes so often observed in patients after operation are familiar to every surgeon paleness of the face and lips, slight cyanosis, soft, running pulse, a feeling of weakness almost to faintness These symptoms are generally thought to be due to surgical shock, even though there seems to be no clear cut idea as to just what surgical shock really is It is my purpose to discuss as an important

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part in causing surgical shock the changes in blood pressure in the capillaries of the skin In my investigation I have tried to determine the effect of capillary pressure in the production of surgical sbock independent of the part played by chemical, nervous, mechanical, secretory, or other stimuli which may he involved

There are many methods by which the blood pressure in skin capillaries may be determined, and the results are often rather contradictory With the Recklinghausen method as a hasis the normal capillary pressure is supposed to he 750 millimeters of water, with the Basler method, 70 to 110 millimeters, with the Goldmann method, 85 millimeters, with the Nevermann, 75 to 150 millimeters Aside from measurements made with the capillary microscope (Stern and Hirsch), the methods most often used are those of Kylin and Raika, the latter having devised a special apparatus In my study, I used a simple but dependable method which was suggested by Herzog The apparatus is connected to a mercury manometer which allows regulation of pressure at will This device is applied to the fingers and a record is made of the minimal pressure at which the small vessels in the arterial supply area of the digital arteries are unable immediately to overcome the resistance Further applications of the device are made, the manometer pressure is lowered and records are made of the minimal pressure at which the finger becomes immediately flushed reading will correspond to the resistance of the capillary bed As can be readily seen this method does not immediately measure capillary pressure but indicates the resistance of the capillaries to the inflow of blood According to Herzog, the normal capillary pressure in healthy individuals varies between 40 and 50 millimeters of mercury

At the Second Surgical Unit of the University of Budapest, the capillary blood

TABLE I - MINOR OPERATIONS PERFORMED UNDER INFILTRATION ANESTHESIA

		Pre-operative pressure		Postoperative pressure							
Case age	Diagnosis			4 to 6 hours		1st day		ard day		5th day	
		Capillary	Brachal	Capilluty	Brachual	Capillary	Brachial	Capillary	Brachial	Capillary	Brachal
2 32 F	Chronic appendicitis	45	115	45	195	43	215	45	115		
2 16 F	Chronic append citis	42	110	40	110	38	110	33		40	
3 27 F	Chronic appendicitis	40	115	35	115	12	trs	40	115	40	
4 72 F	Chronic appendicutes	41	110	44	113	44	110	44			
5 41 F	Chronic appendictus	50	115	50	Ito	50	110	50			
0 4r M	Chronic appendicatis	35	110	35	tto	35	100	55	110		
7 43 31	Chronic appendiction	\$5	130	35	210	26	115	35			
8 26 M	Chronic appendictis	40	125	40	113	10	120	40			
0 40 31	Chronic append titis	45	130	45	125	45	110	45	115		
10 29 F	Chronic appendicties	35	110	35	los	35	250	55			
27 42 M	Herma	31	110	35	140	35	130	5\$	140		
12 20 M	Herma	35	130	35	415	5\$	110	55	115		
23 45 F	Herma	40	130	49	132	40	\$15	40	11		
24 45 F	Hernis	45	240	45	140	45	130	45	235		

pressure of 80 individuals was determined before operation, after operation, and during the following 4 to 5 days Measurements were also made at the same time of the blood pressure in the brachial artery. The cases were all current surgical material. They are summarized in Tables I to IV, as follows (1) Those in which minor operations were required-appendectomy, hermorrhaphy, operations for hydrocele, and so on-performed under innitration anesthesia, (2) gall bladder operations, (3) gastrectomy for ulcer performed under infiltration anesthesia, and (4) other laparotomies and miscellaneous majnr operations Response in cases in the first group was so uniform that only a few typical cases are shown in Table I

In the first group no postoperative change in capillary pressure could be observed either in several hours or a day after the operation, with the exception of 3 cases. The addition of epinephin to the anesthetizing solution—procaine—had no effect whatever. In the 3 instances mentioned, there was some post operative fall in the capillary pressure. The postoperative fall in arterial pressure was normal. This demonstrates the fact that capillary pressure may remain uninfluenced by a fall in arterial pressure.

stress the great stability of capillar, pressure, as shown by the fact that factors which caused a marked lowering in arterial pressure did not cause a fall in capillary pressure

In the second group (Table II) the opera tions were performed under ether inhalation anesthesia With the exception of 2 cases there was n fall in capillary pressure after operation amounting to 5 to 15 millimeters of mercur. The first measurement was made 6 bours after operation and the measurements were repeated several times in the next 4 days In most cases there was a concurrent fall in the arterial pressure, in a few instances, how ever, the decrease in capillary pressure pre ceded the fall in arterial pressure. In some cases the capillary pressure fell as early as 6 hours after operation, whereas the arterial pressure did not start to fall until the next day The fall in capillary pressure was in variably associated with a fall in arterial pressure On the third to the fifth day both the capillary and the arterial pressures rose

to their normal levels

In Table III are shown the cases in which
operations were performed under infiltration
anesthesia. The extent of the operation and
the length of time for its performance were
sufficient to account for a marked degree of

TABLE II —GALL BLADDER OPERATIONS—CHOLECYSTICTOMIES—PERFORMED UNDER ETHER INHALATION NARCOSIS

Maria de Carres		1		Postoperative pressure							
Case age	Pre-operati	Pre-operative pressure		4 to 6 hours		est day		3rd day		5th day	
and des	Capillary	Brachial	Capillary	Brachlal	Capillary	Brachial	Capillary	Brachal	Capillary	Brachat	
1 38 F	45	130	25	120	35	125	40	1 30	45	130	
2 45 F	45	135	35	X25	35	135	45	130			
3 46 F	35	125	25	190	3,5	tto	35	225			
4 33 F	35	130	25	Its	30	170	35	110			
5 52 F	40	130	35	115	30	130	40	130	45		
6 50 F	45	510	40	130	10	130	35	tjo	45		
7 52 F	45	150	40	150	35	*55	35	150	45		
8 45 F	35	110	#0	130	20	90	20	kta	35		
0 41 F	45	115	35	115	40	115	40	X20			
10 43 F	3.5	130	25	110	20	210	35	225	,		

TABLE III -GASTRECTOMIES FOR ULCER PERFORMED UNDER INFILTRATION ANESTHESIA

SECTION AND ADDRESS OF THE PERSON NAMED IN	-										
				Postoperative pressure							
Case age	Pre-operative pressure		4 to 6 hours		tst day		37d day		5th day		
	Capillary	Brachial	Capillary	Brachial	Capillary	Brachial	Capillasy	Bracket	Capillary	Brachial	
1 30 VI	35	213	15	\$15	20	100	30	110	35	trs	
2 57 51	10	110	20	\$05	10	105	25	110	30	110	
3 26 11	70	115	25	120	30	220					
4 55 35	30	315	22	100	10	100	25	110	30	115	
5 52 1	85	120	35	600	35	102					
6 31 W	30	110	70	95	20	95	22	100	30	110	
7 83 M	32	110	25	35	20	80	25	95	30	105	
8 30 M	35	115	25	100	20	95	25	110	35		

shock, causing lowering of capillary pressure In 8 cases partial gastrectomies were done after the Billroth II method and combined abdominal wall and Braun splanchnic intiltration anesthesia was used. In all cases the preoperative pressure was found to be near the lower limit of normal values-which can be explained by the fact actually observed in my patient, that the lower arterial pressures prevail in vagotonic ulcer patients. In all but i case the capillary pressure showed a decrease which was observable as early as the afternoon of the day of operation This decrease amounted to 5 to 10 millimeters of mercury The absolute decrease is less than that in the cases shown in Table I If, however, the proportional decrease is calculated, it proves to be of approximately the same magnitude Synchronism in the changes in arterial and capillary pressures is often observed

In Table IV are tabulated the cases in which laparotomies were performed to relieve peritorical adhesions and as well other miscellaneous major operations. After laparotomies under infiltration anesthesia the capillary pressure fell, just as it did after gastrectomies. A marked decrease in capillary pressure occurred after the amputation of a limb performed under inhalation anesthesia, in a cranication for the removal of a cerebellar tumor which was performed under local anesthesia, and in a case of bleeding gastric ulcer Marked fall in capillary pressure was noted on the second day after operation. The bleeding

TABLE IV -- MISCELLANEOUS OPERATIONS, PERFORMED UNDER ETHER INHALATION NARCOSIS

				Pre-operative pressure		Postoperative pressure							
Ca	Case age and sex	Deagnoses	4 to 6 hours			rst day		grd day		5th day			
				Capillary	Brachtal	Capillary	Brachsal	Capillary	Brachial	Capillary	Brachial	Capillery	Bracherl
1	50	M	Adhesions	30	112	30	105	30	110				
2	33	M	Adbesions	40	120	15	105	35	100	40	110		
3	56	M	Stomach tancer	40	130	30	110	40	120				
4	43	M	Stomach capter	40	135	30	110	35	215	35	130		
\$	42	F	Cerebellar tumor	40	145	40	110	10	80	25	110	40	110
6	38	V	Hematemesis	25	110	20	105	15	95				
7	59	F	Cancer of breast	40	160	40	745	35	¥45	40	150		
8	50	F	Cancer of breast	50	165	50	250	40	E40	45	150	\$0	750
,	45	F	Myoma uteri	40	120	20	115	50	105	40	110		
10	27	F	Amputation cruns	3.5	110	25	95	#5	95	35	105		
11	18	M	Amputation cruris	40	110	35	Tio	10	95	35	110		

ulcer terminated fatally in spite of repeated blood transfusions, capillary pressure fell continuously and progressively until death ensued In no case were we able to record a pressure below 15 millimeters of mercury Neither the herniorrhaphy nor the radical amputation of the breast affected the capillary pressure It has been demonstrated by Blalock, Ewig Klotz, Beard and Johnson, that surgical shock is associated with lowered blood pressure That the capillary system is relatively independent of the arterial system is positively warranted by my studies of the effect of operative trauma on capillary ntessure Any major surgical operation produces many factors which affect the func tion of the capillary system, and it is difficult to disentangle one such factor from the other

First, as to nervous regulation, the sympathetic innervation of the capillaries is brought to mind Stimuli acting on the peripheral nerves may have a prompt effect on the capillaries. Sudden circulatory collapse during an operation may be brought about also by stimuli acting on the central nervous system If a rabbit is frightened, the capillaries of its ears may show a marked reaction, which is easily observed (Krogh). During operation, ample occasions may arise for the occurrence of such psychic vasiomotor reflex phenomena. Both fear and pain may affect the vasomotor system via the central nervous system.

Second, chemical substances which act on the capillaries may be mentioned. Such substances are formed in all surgical operations Trauma incident to any operation destroys tissues and causes the death of many cells so that disintegration products, albuminoid com pounds, are liable to enter the blood stream It is a well known fact that after tissue injury. histamine like substances are liberated which play a significant part in the production of shock The concept of a "capillary poison" is credited to Heubner The effects on the cir culation produced by the intravenous ad ministration of histamine bave been described by Dale and Laidlow Injection of histamine causes a fall in blood pressure and the dilata tion of capillaries The reports of the Medical Research Committee on Surgical Shock em phasize the role of capillaries in the production of circulatory failure A vicious circle is established First there is a toxic paralysis of the capillaries followed by progressive cir culatory failure This in turn causes anoxemia of tissues and a decreased supply of vasomotor hormones to the tissues, and finally the vessels become increasingly dilated Therefore, a decrease in capillary pressure after operation is but an indication of the presence of surgical shock

Third, the effect of the anesthetic agents on the capillaries, an equally important factor, should be stressed Dale and Laidlow, in their paper on histamine shock, point out that in narcotized animals shock is prone to occur quickly and in a particularly serious form The effect of inhalation anesthesia on blood pressure depends on its depth and duration The effects of histamine and the narcotizing agent do not seem to be simply superimposed on each other, their relation seems to be more one of synergetic activation (Krogh)

Finally, I wish to mention postoperative acidosis, a factor which, too, is hable to have an effect on capillary pressure In his studies. Fleisch found that it is possible to cause a decrease in capillary pressure by injecting acidulated solutions into the vessels of anımals

The methods used to combat the pathological decrease in capillary pressure after operation are the same as those for surgical shock The use of drugs which raise the tonicity of peripheral vessels-caffeine, strychnine, ep inephrin-and as well the administration of isotonic-preferably colloidal-solutions are the most rational forms of therapy methods are useful in surgical shock as well as in decreased capillary pressure caused by the dilatation of the capillaries

SUMMARY

Blood pressure in skin capillaries, as measured according to the method of Herzog. was found to be lowered after certain operations Appendectomy, herniorrhaphy, minor operations performed under infiltration anesthesia did not cause appreciable change in rapillary pressure Major abdominal operations, which were performed under either local or inhalation anesthesia, caused a fall in capillary blood pressure which was concurrent with a lowering in arterial pressure. The decrease in pressure is noticeable as early as 4 to 6 hours after completion of the operation and the pressure returns to normal within a to 5 days later

Decreased capillary pressure may be regarded as a component part of surgical shock Stimuli which cause dilatation of the capillaries are (1) nervous impulses, (2) tissue disintegration products-histamine-like sub-

stances, (3) anesthetic agents, (4) shift of the reaction of the blood toward acidity The treatment of decreased capillary pressure and surgical shock should be along iden-

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NEO-SYNEPHRIN HIDROCHLORIDE IN THE TREATMENT

OF HYPOTENSION AND SHOCK FROM

TRAUMA OR HEMORRHAGE

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THE hemodynamic drugs commonly used in the treatment of the hypotension of shock from trauma or hemorrhage are epinephrin, ephed rm, and neo synephrm hydrochlonde preliminary report of the use of neo synephrin hydrochloride as an adjunct in the treatment of shock was made in July, 10,6(2) That report also contained the results of numerous studies on the pharmacology of the drug Earlier studies on the pharmacology had been made hy Auschinsky and Oberdisse (3) in Germany, and by Tainter and Stockton(5) in this country Since the first report, 52 additional patients with hypotension following trauma or hemor rhage have been treated with the drug and this paper is a brief summary of the reports

eo synephrin hy drochloride is a synthetic drug closely related structurally to epinephrin and ephedrin Pharmacologically, some of its actions are different and from the point of yiew of this study the chief differences are

The structural formula of neo synephrin hydrocoloride as compared with epinephrin hydrochloride is as follows

Neo- vnephrin hydrochloride - Fpinephrin hydrochlorid

2 The subcutaneous injection of neo synephrin hydrochlonde causes a marked and sustained rise in blood pressure, i.e. i cubic centimeter of a 10 per cent solution subcutaneously, cause a rise which usually lasts from i to 2 hours. Epinephrin subcutaneously.

From the Department of Medicine of Northwestern University and St. Luke's Hospital does not uniformly cause a rise in blood pressure

3 In the patients studied, neo synephin hydrochlonde did not produce extra systoles or abnormal rhythms, as may occur with ephedrin or epinephin. The evidence of abnormal mechanisms is an important con sideration.

4 It causes a slowing of the heart rate while ephedrin and epinephrin increase the heart rate

5 It does not cause nervousness, or palpi tation, both of which are common complaints

with ephedrin or epinephrin

6 Neo synephnn hydrochlonde has a verwde margin of safety as compared with sphedrin. The fatal dose of neo-synephnn hydrochlonde in the dog when given intrave nously in divided doses is about 250 milli grams per kilogram, while the fatal dose of sphedrin intravenously as determined by Chen is 70 to 75 milligrams per kilogram of the dog. The fatal dose of epinephnn in the dog when given intravenously is 0 i to 06 milligrams per kilogram (4). It is well known chinically that small doses of the epinephrin may produce alarming symptoms.

The material studied were patients who were under treatment at St. Luke's Hospital, the University of Illinois Research Hospital, and at Passavant Hospital Chicago, which included the following types of cases

(1) surgical patients in which hypotension with or without shock occurred during or after surgical procedures (2) patients with hypotension with or without shock following traumatic injuries (3) patients in whom the drug was used as a prophylactic against the vascular depression which often occurs during spinal anesthesia. In addition it was also used in a number of patients to restore the blood pressure which occasionally falls preceding

7

x

1

operations on the gasserian ganglion as a result of the upright posture, nervous apprehension, etc. This vascular depression often occurs before any operative procedure has heen started

The first group included 16 genito-urmary patients, 10 orthopedic cases, 7 neurological patients, 7 general surgical patients, and 3 obstetrical and gynecological patients. The operations are listed in Table I

TABLE I-TYPES OF CASES

Transurethral resections Prostatectomies Rephrectomies Stricture of the urethra Bladder resection for carcinoma	
Nephrectomies Stricture of the urethra	
Stricture of the urethra	3
	3
Bladder resection for carcinoma	1
	1
Removal of tumor or prostate	1
Orthopedic patients	

Spanal fusions Incision and drainage of osteomyelitis Laminectomics Hip Shelving
Neurological patients
Operations on the brain and spinal cord

General surgical patients
Abdominal laparotomy for surcoma
Gastne resection
Resection of a feet of bowel for strangulation

Cholecystogastrostomy Carcinoms of rectum Radical hreast amputation Teratoma of spine

Obstetrical and gynecological patients Abruptio placentæ with severe hemorrhage Inverted uterus following delivery

The second group of patients were those who developed hypotension following accidental injuries: Of the 9 patients treated, 4 followed automobile injuries, 2 fell from 40 and 60 feet, respectively, 1 was struck by a steel plate, and 2 were shot during holdups. All of these patients had multiple fractures except the 2 who were shot in the chest

Of the third group of patients 5 were given the drug to prevent the vascular depression which commonly occurs during spinal anesthesia, and 11 were given the drug to restore the blood pressure and prevent fainting which may occur preceding operations on the gasserian ganglion as a result of the patient being in the upright posture, apprehension, etc.

Finally, one patient was given neo-synephrm hydrochloride during a treatment with foreign protein in which an alarmingly low blood pressure developed The drug did not cause the usual rise in blood pressure during the period of anaphylactic shock. The studies upon 4 patients which were proved at autopsy to have generalized peritonitis, which may be classed as a toric shock, gave somewhat similar results on the blood pressure The differences between the action of the drug in torac shock as compared to its action in the other surgical cases with hypotension with or without shock, suggest the futility of attempting to carry over experimental results from one type of shock to the other as, in all probability, the mechanisms of the two types of shock are different

The average dose of the drug given was 5 to 10 milligrams subcutaneously and repeated if necessary The blood pressure was taken every 20 minutes until it was certain that the blood pressure would sustain itself. The number of doses necessary to accomplish this varied from a single dose to 23 doses. The treatment is illustrated by 6 detailed case.

reports which follow

In the series of 52 patients where the hypotension followed operations or injury, there were 10 deaths with postmortem examination in 7. Of these 7, 4 died of generalized pertomuts, 2 of uncontrolled hemorrhage, and 1 from hemorrhage and shock. Of the 3 remaining patients on whom autopsies were not obtained, the clinical causes of death were multiple fractures, hemorrhage, and shock.

It should be mentioned that neo-synephrin hydrochloride did not slow the heart rate in patients with shock, as is a common result in normal unanesthetized patients. Also, it did not increase the heart rate

EVALUATION OF STUDY

The presence of shock from trauma or henorrhage is often difficult to determine There are several objective findings usually listed as being present in shock such as low blood pressure, rapid and thready pulse, prostration, etc., but even though these findings may be present, the severity of the shock still remains a matter of clinical impression

In this series of patients, the blood pressures were low in all, the pulse was weak in all, but in a large number the heart rate was not as fast as one would expect of a patient in shock. One striking observation was the severity of the clinical appearance in some with only moderately depressed blood pressure, while others had very low blood pressures for long periods and still clinically the patients did not appear to be in a critical condition.

The subjective symptoms and the objective findings of shock are so variable that it is often difficult to diagnose true shock. For this reason this report is only concerned with the treatment of the hypotension following trauma of hemorrhage with or without the presence of shock.

The mechanism of shock is still in dispute. but whether it is toxic or reflex, or a combina tion of both, there is agreement that there is a loss of the effective blood volume. There is a difference of opinion whether the blood merely stagnates in the vascular system (the patient bleeding into his own vascular system) or whether there is a passage of plasma from the vascular system with a decrease of the effective blood volume in this manner. The result of this study would tend to support the first view The rapid and sustained rise in blood pressure following the subcutaneous injection of the neo synephrin hydrochloride seems most easily explained by rapid decrease in the volume capacity of the vascular depots of the body and in this way increasing the effective blood volume There is also the associated increased cardiac output as is demonstrated by experiments which bave been previously reported

It has been recognized throughout this study that no single treatment is adequate in the treatment of shock, and in this series of patients nee synephrin hydrochlonde has been used only as an adjunct to the other recognized forms of therapy. Many of these paintents would have recovered without the use of this drug but if used as recommended, it offers a safe and rapid method of sustaining the blood pressure during the critical stage while other recognized forms of treatment for shock are being instituted.

CASE I Paul Stoner white male, aged 52 years was admitted to St Luke's Hospital on June 19 1936 Following is a tabulation of the clinical course

Date	Time	Blood pressure	Remarks						
6-19-36	_	148/06	Admitted						
6-23-36	700	110/70	Transurethial resection bled profusely						
	9 00	70/40	5 mgm neo-synephria given subcu taneously						
	10 15	00/70							
	11 00		5 mgm neo-synephrin given subcu taneously						
	12 50	117/00							
	1 00	116/go							
	200	114/85							
	3 30	114/88							
	300	110/80							
	4.00	110/50							
	5 30	\$16/85							
	6 30	E16/go							
	7 30	132/00							

CASE 2 Charles Sutherland white male, aged 67 years was admitted to St Luke's Hospital, on September 2, 1936 for prostatectomy by Dr Cuher Following is a brief résume of chincal course

Date	Time	Blood pressure	Pulse	Remarks
9- 4-36		164/222	105	
9-8 36	9.35			Operation tarted avertinether ane-thesia
	£0 15	60/7	80	
_	10 15	74/60	74	
	10 33			to mgm neo-synephtin given subcutaneously
	10 45	110/100	70	
	10 20	140/110		
	11 12	111/01		
	\$ 20	110/73	88	
	3 10	110/78	86	
	4 10	118/86	84	
	6 00	110/23	92	
	10 3	114/78	88	
	11 00	110/80	116	
g- g-36	p 30	110/80		

Patient went on to recovery

CASE 3 Herman Gorgas, white male, aged 61 years, private patient of Drs Baker and Culver, was admitted to St Luke's Hospital for transure their resection

Record of the blood pressure follows

	Record of the prood bresidte tonows									
Date	Time	Blood pressure	Remarks							
5-27-36	1 00	146/95	Admitted							
5-19-35	-		Transurethral resection							
	1 45	74/60	Chiff							
	1 50		s mgm neo-synephtin given subcu tantously							
	2 00	90/64								
	2 10	86/60								
	2 20	80/60								
	2 25		5 mgm, neo-synephina given subcu taneously							
	\$ 30	94/66								
	3 40	95/30								
	2 45	96/63								
	6 00	84/62								
5~10-36		224774								
6- 1-36		120/70								

Patient went on to recovery

CASE 4 Thomas P Dudley, white male, aged 71 years, was admitted to St Luke's Hospital, on September 27, 1936, as a private patient of Dr George Coleman On October 3, 1936, a left nephrectomy was done by Dr H E Jones The operation was started at 3 25 and finished at 5 20 At 8 30 to milligrams of neo-synephin hydrochlonde was given subcutaneously after which the blood pressure continued to rise slonly

Record of the blood pressure and of the pulse pres sure follows

Date	Time	Blood pressure	Pulse	Remarks
10- 3-36	3 25			Operation started
	5 20			Operation finished
~	5 5 5	83/65		
***************************************	7.45	50/30	130	
**********	8 10	66/46	-	
***************************************	8 30	56/45	124	10 mgm neo-synephsia given subcuta recounty
	8 56	90 56	1	
***************************************	9 5 5	105/72	103	
10- 4-36	5 10	117/64	103	

Case 5 Charles McKiel, white male, aged 76 years, was admitted to St Luke's Hospital, on September 19, 1936, as a private patient of Dr Culver, for a perineal prostatectomy

Remarks

Date Time pressure Pulse

Date	Time	pressure	Pulse	Kemarks
9~20~35		t30/80	76	
9-28-36	9 37			Operation started
-	10 15			Operation finished
	10-47	40/?		to mgm neo synephrin given subcutaneou ly
	to 58	90/03		
	11 08	150/80	82	
	11 20	150/80		
	££ 46	76/40		
	11 00	20/>		to mgm neo-typephrin given subcutaneously
	1214	170/100		
	12 50	174/90		
	[2 50	104/50	95	
	812	66/36		to mgm neo- ynephem given subcutaneously
	1 45	130/00	5.3	
	3 00	80/60		
	3 00	78/60		
	3 30	78/60		
	4 00			5 mgm neo-tynephrin given tubeutaneously
	4 15	£16/60		
	4 30	115/60	 	
	4 45	86/50		
·	2 00	82/53		subcutaneously
	5 13	96/68		
	5 30	06/60		
	\$ 45	83/60	100	
	600	88/60	100	
	615	68/52	92	
	6 30	70/50	92	
	6 45	74/52	94	
-,	7 10			s tagm neo-ynephran gaven subcutapeously
***************************************	7 15	01/00	93	
	7 30	94/80	- 00	
-	8 90	96/80	92	
	8 15	90/18	88	
***********	8 10	78/64	86	5 mgm neo-synephria given subcutaneously
	9 90	90/78	-58	
	9 15	92/80	83	
	0 10	06/80	90	
	10 00	96/80		
***************************************	10 25	90/80	96	
	20 30	86/79	98	
-	10 45	80/71	06	

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IOHNSON NEO-SYNEPHRIN HYDROCHLORIDE IN HYPOTENSION AND SHOCK 463

Case 6 -Continued

armer, armer	******		*********	**********	
Date	Time	Blood pressure	Pulse	Respa ration	Remarks
	2 20	70/50	84	20	
	1 10	53/52	01	30	5 mgm neo-synephina given subcutaneously
	\$ 10	72/56	83	20	
	3 30	62/52	8.5	30	green subcutaneously
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	400	74/38	Q2	30	
	4 30	62/52	90	70	5 mgm neo-synephrin given subcutaneously
	5 10	75/56	83	20	
	5 30	72/56	83	20	
	6 00	62/54	94	20	5 mgm neo-synephrin given subcutaneously
	6 30	70/55	83	20	
	7 00	62/54	90	50	5 mgm neo-synephrin given subcutaneously
	7 #5	90/60	84	10	
	7.30	70/58	86	20	
	7 45	62/51	95	72	5 mgm neo-synephrin given subcutaneously
	8 20	72/35	90	22	
	5 25	70/45	95	10	
	5 30	64/20	102	30	5 mgm neo-synephrin given subcutaneously
	9 00	80/54	96	20	
	9 25	99/54	34	13	
	9 30	94/54	84	r8	
	9 45	86/48	60	15	
	19 00	70/50	94	15	
	10 15	76/48	96	81	
	10 30	70/45	96	82	
	10 45	64/40	103	18	5 mgm beo-synephran given subcutaneously
	11 00	toe/61	80	18	
*a m					

The blood pressure in this patient (Case 6) con tinued to fluctuate between 80 and 100 and, without neo synephrin, rose spontaneously to 118/60 at 6 45 pm, on October 8, 1935 The patient went on to recovery from the operation

SUMMARY

The results of the use of neo synephrin hydrochloride as an adjunct in the treatment of 52 patients with hypotension, with or without shock, from trauma or hemorrhage have been presented with favorable results in all except those who were demonstrated to have died of peritoritis or uncontrolled internal hemorrhage Three patients died with multiple fractures, in whom the exact cause of death could not be determined by necropsy

The drug also gave favorable results as a prophylactic to the usual fall of blood pressure during spinal anesthesia and also was very effective to restore the blood pressure in pa tients in whom a vascular depression occurred before operations on the gasserian ganglion

I am indebted to the Surgical Staff of St Luke's Hospital Dr Loyal Davis of Passavant Hospital, and Dr G de Takats of the Illinois Research Hospital for the privilege of making this study upon their patients

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FRACTURES IN CHILDREN

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TO obtain an adequate appreciation of the clinical importance of the epi physeal cartilages one has only to reflect that abnormalities of growth are responsible either solely or in part for the majority of deformities of the extremities that arise during the growth period. These carti lages which are productive of all growth in the length of long bones are very responsive to many influences and these influences can be classified broadly into two groups (1) those of a generalized character which act upon all epiphyseal cartilages simultaneously and equally and produce generalized and symmetrical abnormalities of growth such as oc cur as a result of nutritional and vitamin deficiency states and as a result of abnormal function of certain glands of internal secretion, eg, cretinism and pituitary dwarfism. and (2) those of a localized character which alter the growth activity of only one or at most of only a few of the epiphyseal cartilages and give rise to asymmetrical abnormalities of growth Excluding growth disturbances resulting from embryonic abnormalities, local ized influences are fundamentally (1) vascu lar, (2) neurogenic, and (3) catabolic

In a previous publication (1) one of us has shown that prolonged hyperemia of an extremity accelerates growth from the epiphyseal cartilages within the area of hyperemia Also there is much evidence that the converse is true, that a diminished blood supply retardsgrowth. Again it is probable that growth disturbances which appear to be neurogenic or the result of disuse, as shortening in flail extremities, are fundamentally vascular in origin

Catabolic influences vary in their effects from temporary insult to partial or complete destruction of the cartilage and are the result of destructive invasion of the cartilage by infection and neoplasms and of injury to it from trauma and from physical agents such as reentgen and radium rays.

From Departments of Surgery and Physiology University of Aebraska School of Medicine For detailed discussions of the many phases of this subject the reader is referred to the many recent publications, among which are those of Phemister, Compere, Harris, Haas, Gatewood and Mullen, Lewin, Snyder, Bis gard (2, 3), Bisgard and Hunt (4), Brooks and Hillstrom, Freeman, and McKenzie

It is the purpose of this paper to present some chinical and experimental studies relative to the influence of trauma upon the epiphyseal cartilage, particularly the injury associated with fractures involving the cartilage and with traumatic separation of the epiphysis

FRACTURES IN CHILDREN

In 1935 Compere reported observations in a series of 200 fractures of long bones in chil

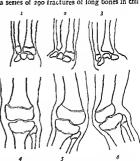


Fig. I Illustrated in top row are deformities resulting from arrested growth in one of two parallel bones. I Normal relations at wast joint. 2 Growth arrest in dutal ulna with resultant ulnar deviation of the hand. J Growth arrest in distal radius with radial deviation of the hand.

In bottom row are depicted deformaties from unlateral growth following growth arrest on one side only 4 Nor mail relations of kine joint 5 Valgus deformity from growth arrest on messal aspect of distal femur and continued growth on lateral aspect 6 Varus deformity resulting firm opposite mechanism.

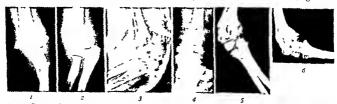


Fig. 2. Tracture with separation of the distal epiphysis of the famur in a boy of 12 years. I Before reduction 2 after reduction which is anatomically per fact. 3 years later. On the hieral aspect the epiphy well line has become obliterated the epiphiss fused to the disphysis and growth on this side arrested Continued growth on the result aspect has produced a knock knee electromity with shortening. 4. The opposite normal knee for comparison. Jand 4 have been retouched

dren under 14 years of age. In 12, or 14 4 per cent of his series, the fractures involved the epiphyseal cartilages. Of these, adequate follow-up records were obtainable in 19, and in 18 of these 19 cases, that is in 95 per cent, there had developed definite evidence of disturbances of growth in the traumatized epiphyseal cartilages. Many of these disturbances were so slight that they were detectable only roentgenographically.

A similar investigation was carried out by the authors During a 5 year period from January 1, 1931, to January 1, 1936, there were admitted to the University of Nebraska hospital 211 children under 16 years of age with 2,2 fractures of the extremities. The break in continuity involved the epiphyseal cartilage in 49 or 21 1 per cut of the series. Follow-up observations including personal and

roentgenographic examinations were made in 28 of the 40 fractures, all I year or more after injury In only 14, 50 per cent of the 28, was there any roentgenologie evidence of failure of growth to progress normally or of failure of the cartilage to resume normal growth activity. As judged upon a strict anatomical basis 13 of the 28 cases presented residual deformities and in only 8 of these could the deformities be attributed to disturbances of growth In the 5 other cases the deformitics, consisting of limitation of motion and of alteration of the normal earrying angle in dicondylar fractures of the distal end of the humerus, had resulted either totally or at least in the main from failure to secure exact anatomical reduction of the fractures. In 6 cases (Figs 2, 5, 6, and 7) shortening had resulted from growth arrest In z of these (Figs 6 and



lig 3. Di epicondylar fracture with epiphyseal separation of the humerus in a girl of 4 years. I and before and 3 and 3 after reduction. Despite an excellent reduction, there developed during the course of 4 years the deformity

shown in 3 and 6. It is apparent that there had been no growth from the mesual aspect and from the mesual epicondile groung rise to a complete reversal of the carrying angle, an obvious deformity. Function slightly limited



Fig. 4. Fracture evulsion of the external epicondyle and capitellum of the humerus of a boy of 73 cars. 7. Retouched roestgenogram before reduction. 2. Open reduction and firstion of fragment with pin extending across the epiphy seal line. The reduction was announcally prierted but traums to the cartilage from the initial injury, from open

operation or from the fixation pin arrested growth at this site and 1/4 years later there was a slight deformity from an increase in the carrying angle 3 and 4 and 6 Anterior posterior and lateral views of the opposite normal clow it is in this type of case that a latent ulnar nerve paralysis is likely to develop

7) the epiphyseal cartilage had been destroyed by infection

In 13 cases there were lateral deviations, 6 valgus and 7 varus, and of these 7 could be attributed to growth abnormalities. Nine had

some limitation of motion due to deformity to which growth disturbances may have con tributed in 4, but if so, to a minor degree only

Fractures are classified in Table I as to dis tribution and types of deformity

TABLE I —CLASSIFICATION OF CASES WITH FRACTURES INVOLVING THE EPIPHY SEAL CARTILAGES

_		Cases total	Cases followed	Shortening		Limited mot on from		Valvus and varus deformities from	
	Fp physeal cartilages			Growth arrest	Other	Growth arrest	Other Causes	Growth arrest	Other causes
ī	Humerus Proximal			1 (2 IA)		1	٥	۰	
	Distal	19	15	1(1111)			5	3	- 5
,	Radius Proximal					۰			
	Distal	9	4					1	0
3	Ulpa Distal	,				۰			
4	Femur Distal		2	I (210)		o		1	
5	Tibia Distal	4	_ 3	ı					
6	Fibula Distal			r			0	1	
	Totals	49	28	6	•	4	5	8	5

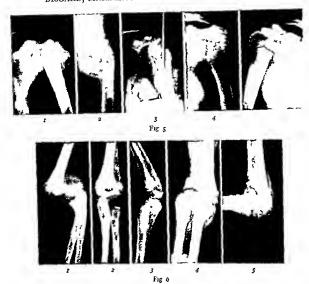


Fig. 5, above Fracture with separation of the presumal epiphysis of the humens of a boy of 11 years x and 2 Con dution (early malunion) upon admission 3 necks after muty. After reduction by open operation. Note fixation of Inagments by a pin which traverses the epiphyseal line. Four years later total growth arrest from premature justion as a result of trauma from accedent operation and fixation pin. The arm was 3 inches shorter than its fellow. The opposite normal arm. The epiphyseal line is still upon (refouched).

Fig o Dicondylar fracture of the humerus involving the epiphyseal cartdage in a boy of 8 years I Pre reduc

DEFORMITIES

The deformities which result from disturbances of growth may take a variety of forms as has been pointed out by Phemister(s₃). Growth may terminate throughout an entire cartilage equally and simultaneously and in a single bone give rise to shortening only or there may be a cessation of growth in only a portion of the cartilage. As the remainder of the cartilage continues its normal growth activity, the involved end of the bone becomes

tion film a and 3 Unsatisfactory reduction and malunion Reduction past ally lost as a result of removal of fixation dressing to relieve circulatory disturbance and a threaten ing Volkmann's schemia. Two months after injury, correction by open operation was done. The nound became infected with seq-estration of some of the distal fragment and with destruction of the epiphyseal cartilages and growth arrist occurred 4 and 5 Condition of the elbow and the deformity 3 years later. Here, v as only 30 degrees of motivos with inability to extend by yond a right angle. The forcarm deviated mensaliv and there was shortening of v inch.

twisted by rotation and by deviation from the normal plane, producing rotational, valgus, varus, and other deformities either alone or in addition to shortening. If growth is arrested at one or both eads in only one of two parallel bones such as the radius and ulina or the tibia and fibula, continued normal growth from the other bone deviates the articulating part, the hand or foot, to the opposite side, the side of shortening. These various types of growth disturbances and the deformities that



Fig. 7. Shortening of 21/2 inches and valgus deformity of the fool in a boy 14 years old from arrested growth from the dittal ends of the this and Shula as a result of destruction of the epiphyseal cartilages by infection which complicated compound fractures of the distal ends of both bones o years previously at age of 8. The fracture of the tibia involved the epiphyseal cartilage.

they produce are illustrated in Figures 1, 2, 3, 7 11 and 12 Analyzed upon this basis, the deformities in the authors series consist of the following

a Lqual total growth arrest with a short ening only in a single or in parallel bones i case, Figure

- b Unequal (fractional or unilateral) arrest with shortening plus valgus or varus deviation—2 cases Illustrated in Figures 2 and 6
- c Total arrest in only one of two parallel bones—I case (Growth was arrested in the distal end of the ulna resulting in ulnar devia tion of the hand)
- d Unequal arrest in both of parallel bones. Although growth may terminate prematurely in both bones, it may terminate in one earlier than the other or unlateral growth may take place from one or both bones. In addition to shortening there develops lateral deviation. In this group there was a case, Figure 7.
- e Unequal or unlateral arrest without de monstrable shortening but with rotation and valgus or varus deformities—3 cases (All occurred in the distal end of humerus, result ing in loss of the carrying angle in 1 case, an increased angle in 1, Figure 4, and a rever sal of the angle in 1, Figure 5)

INFECTION

Infection involving the fracture site and the cartilage usually results in its destruction and consequent growth arrest. In Compete see nes 5 cases were complicated by infection and in all 5 growth was arrested. In the author's series there were only 2 infected cases. One was an infected compound fracture of both bones of the right leg. The fracture lines in both bones extended into the epithy s.al cart lages which were destroyed by the infection.



Fig. 8 Fracture separation of the radial epiphysis of a boy of 13 years also a green stick fracture of distal shaft of ulna. Reduction as shown in the lateral view (fourth from left) was incomplete. Nevertheless growth resumed

and has progressed normally now 21/2 years after injury.
Note that in the 2 roentgenograms to the right there is no
deformity and no abnormality in the appearance of the
epiphyseal cartriage of the radius.



Fig. 9. Fracture separation of the distal epiphysis of the radius of a boy. If years old, Although reduction was complete the 2 roentgeno grams to the right made 3½ years later show premature fusion of the radial epiphysis as evidenced by obliteration of the epiphyseal line throughout most of its extent Compute the epiphyseal line in the radius with that of the ulna. Ulnar deviation of the hand was slightly restricted.

and growth was arrested. The resulting deformity is shown in Figure 7. In the other case, a fracture of the distal end of the humerus shown in Figure 6, there was destruction and sequestration not only of the epiphyseal cartilage, but also of part of the epiphysis Obviously, there was no further growth from this end of the humerus

Infections are introduced (1) at the time of injury in compound fractures as in Case 1, (2) in the course of an open operative reduction as in the second case, and (3) from extension from infected bone in pathological fractures of osteomy clitis

SURGICAL TRAUMA

There is much evidence that after fracture each additional insult to the epiphyseal cartilage inflicted directly at open operation or indirectly through manipulation increases the likelihood of growth disturbances. Although complete anatomical reduction is especially desirable, it should not be insisted upon in the presence of a satisfactory reduction, unless it can be obtained without increasing the risk of greater damage to the cartilage. There is no group of fractures in which gentleness of ma-

nipulation and avoidance of open operation are so important. It is not unusual, as shown in Figure 8, for an epiphysis which is only partially replaced to become completely replaced spontaneously or to resume normal growth in spite of incomplete reduction. Compare Figure 8 with Figure 9.

The dangers of open operative reduction are illustrated by cases represented in Figures 4, 5, and 6, and these dangers have been forcefully brought forth by the experimental work of Haas and Gatewood and Mullen They have shown that in dogs, trauma insignificant as exposure of the cartilage by elevation of the soft tissues may result in premature cessation of growth from that cartilage

FRACTURE FILATION

Thus, it follows that reduction by open operation should be accomplished with as little exposure of and injury to the cartilages as possible. Also the reduction should be maintained if possible without the introduction of fixation material and if such material as pins, nails, screws, plates, bone grafts, etc., are used, they should not enter or traverse the epiphy seal cartilage if this can be avoided. If spicules



Fig 10



Fig 11

Fig. 10 Fracture separation of the distal timal epiphysis with green stak fracture of the distal shaft of the fibula an a boy of 13; pars before and after reduction. Roentgenograms made 5 years later showed no deformity and gave no exdence that growth had been disturbed. The epiphystal lines on both the injured and normal sides had fused pre sumably the physiological termination of growth.

Fig. 1. Tuberculosis of the knee your fixed by placing bone grafts across the joint antenorly. The grafts crossed the epiphysical lines of both the femire and thus causing growth across antenorly. As growth progressed posteronyly here developed a recurvatum deform ity. Note corrections busined by an extensionary of the thin. Continued Courtey surgical department University of Vichigan.)

of bone extend across the epiphyseal line, they should be removed. In short, every effort should be made to maintain an intact epiphys eal cartilage with normal separation between the diaphysis and epiphysis.

In the 5 cases of the authors' series in which open operative reductions were done, immediate growth arrest followed in 4, and in 3 of these (Figs 4, 5, and 6) fixation puns travers ing the emphyseal cartilages had been used

It should be emphasized that these were the only cases in the series in which fixation maternal had been used, thus giving roo per cent growth arrests

Phemister(13) has shown that grafts placed across the epiphyseal line so as to establish bony continuity between the epiphysis and diaphysis on two opposing sides stop growth promptly. If only one side is bridged the restriction of growth is confined to that side of

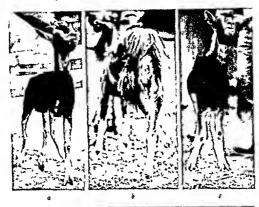
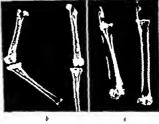


Fig 12a, Shortening of to centimeters in the right foreleg following arrest of growth from the proximal end of the humerus and from the distal ends of the ulna and radius Growth was ar rested by removing much of the epiphyseal cartilages and hy bridging the epip hyseaf lines on both mesial and lateral aspects by bone grafts as devised by Phem ister These operative pro cedures were carried out so months previously when the animal was t month old b, A boyleg deformity pro duced by undateral growth from the distal end of the



femur and from the proximal end of the tiba. Growth was arrested on the mesal aspects only and was arrested when the goat was 3 needs old. As growth continued on the lateral aspects progressive rotation and lateral deviation gradually developed arrea a period of 1: months. g. (thirst deviation of the right forefoot in their resulted from arrest of growth from the distal end of the ulna when the animal was 6 weeks old. Since growth in the rights continued normally the foot was forced into links deviation.

area and lateral deviation deformuties result. This has been emphasized by Snyder and is illustrated in Figure 11, a child with tuberculosis of the knee joint in which grafts were placed across the joint anteriorly for purposes of tission of the joint. It so happened that the grafts bridged the epiphyseal lines of the joint and tibia restricting growth anteriorly. But as growth continued from the rest of the

cartilage the leg was bent into a recurvatum deformity

GROWTH ARREST IN FAPERIMENTAL ANIMALS

An investigation of traumatic growth arrest was carried out in 9 of 10 kid goats. One died All were less than 1 month of age at the beginning of the experiment when they were subjected to operative procedures and all were

observed for evidence of growth disturbances over a period of 10 months or more. Only those epiphyseal cartidages which are known to give use to a major portion of growth of an extremity were subjected to operative procedures. A brief summar, follows.

I In 4 goats the rpphyseal cartilages were expo ed at the ends of the bones from wheth it was
planned as mess growth. With an extention as
gular continuous and the continuous activation as
gular continuous and for continuous activation as
gular continuous activation and for a continuous
dub i hemi ner. The ends of the graft were transposed so that the longer segment from the diaphysion
dude to the emphyseal line and establish bed bone
continuity between the diaphysis and the epiphysis
in only a animaly was growth arrested one imme
dately and one after a lap e of 6 months. In tho e
in which growth failed to become arrested there was
reentgenographic evidence of failure of grafts to
fuge with the epiphysis.

11 After ob ening only parinal success in the bril group of animal it was decided to repeat the same studies supplementing the introduction of grafts with removal of some of the adjacent cardibles with a curetie. The results were 80 per cent immediately successful and 100 per cent ultimately suces full growth arrest being cleared in 1 animal.

I Bit treat equal or total arrest in a goats graits nere placed on opposite ides acro sithe epiphs seal lines of the proximal end of the humerus and the distal ends of the ulna and radius of the right leg. Which oleach cartilage sais removed. Growth street promptly occurred and to months later the right legs were to and 12 rectimiters shorter re-pectively than the left ones. A photograph of one animal is shown in Figure 12a.

B Unideral (unequal or partial) arrest In a B Unideral (unequal or partial) arrest In a goalt graft were placed across the epiphs seal line, at the distal end of the femur and proximal end of the cartilage curetted on the mesal sides of these bones only in both animals growth card on the mesal a pect but continued el ewhere cau ing-ome internal rotation of the legs and marked bowlegged deformite. A photograph and roentgenogram of a animal appear in Figure 12.

C Total arrest in only one of the parallel bones. In a goats growth was arrested in the di ial end of the ulna of the right leg by means of grafts and of removal of cartilage. One animal died. In the other one there developed marked ulnar deviation of the right foot. The deformity is shown in Figure 126.

TREATMENT

As in treatment of most deformities those arising from disturbances of growth are best treated by application of principles to present their occurrence if possible and once developed, to retard their progress. These principles

ples, as avoidance of damage to cartilage from infection, trauma, etc., have been discussed

The treatment of established deformities, although following certain general principles must be planned to meet the problems of an udavidual case. Most deformities are so slight that no treatment is indicated, some can be reheved or corrected by orthopedic appliance such as braces and shoe elevation while a few demand operative interference.

Shortening of a lower extremity may be treated by operative lengthering of the short leg operative shortening of the long leg or by arresting growth from one or more of the epi hyseal cartulages in the long leg. By the lat ter procedure as devised by Phemister, growth in the normal or long extremity is retarded in an amount sufficient coropletely or partially to equalize the length of the two extremities be fore the normal growth period is terminated

To correct rotational, valgus, varus, and other deviation deformities corrective obtomies must be done. However, if unliateral growth is permitted to continue the deformity mill gradually recur. Consequently, there are three possible courses to follow (1) reverse corrective osteotomy until growth bas terminated normalls, (2) terminate growth completely by operative arrest on the side from which growth is still taking place at the time the osteotomy is done. (3) do repeated o te

otomies until growth terminates normally So long as the deformity is not too exten sixe and so long as it does not cause significant remote secondary changes in the extremity and spine from abnormal stresses operative correction may be delayed. If correction be comes necessary in an extremity in which the involved epiphy seal cartilage gives nie to very httle growth in length, e g, the cartilage of the distal end of the humerus or in which the carti lage has reached maturity and will give lit tle or no subsequent growth, total arrest of growth to prevent recurrence of the deformative should be carried out at the time the osteot omy is performed. If total arrest would cause much shortening it would seem wiser to per mit unilateral growth to continue and re-ort to repeated osteotomies thus gaining all length possible Deformaties from arrested growth in one of two parallel bones can be lessened and

occasionally corrected by arresting growth at both ends of the normal or longer bone. Often, however, it is necessary to shorten the longer one or lengthen the shorter one

CONCLUSIONS

1 Fractures in long bones of children involve the epiphyseal cartilage in more than to per cent of cases, 75 per cent in Compere's series, 21 per cent in the authors' series. These latter statistics undoubtedly do not represent accurate cross sections of this group of fractures as a whole because they were collected from clinics which receive disproportionately large numbers of complicated fractures

Deformities of clinical importance developed as a result of growth disturbances in only 6 cases, or 2 5 per cent of our series of fractures in children under 16 years of age These 6 cases represent only 12 per cent of fractures in which the epiphyseal cartilages were involved in the injury despite the roentgenographic evidence that in 50 per cent of these cases the miured epiphyseal cartilages fused prematurely or failed to resume completely normal growth activity. Obviously in most cases the disturbances of growth which followed injury were insignificant. They gave rise to demonstrable deformities in 8 cases, 2 of them clinically unimportant. These 8 cases represent 28 per cent of the entire group in which the fracture involved the epiphyseal cartilage or 35 per cent of the entire series of fractures in children under 16 years of age

In other words these observations indicate that a child under 16 years of age who sustains a fracture of a principal long bone is confronted with only a 25 per cent chance of having an important residual deformity although he has a 20 per cent chance that the fracture will involve epiphy seal cartrlage and, if it does, a 50 per cent chance that a growth disturbance usually inconsequential will result

Since deformities from abnormal growth appear months after a fracture his healed and continue to progress during the remainder of the growth period, every child with a fracture which involves the epiphy seal cartilage should be observed periodically for a year or more and the pittint or bis family warned of the possibility of this sequela Another late complication which deserves mention is the ulnar nerve paralysis which develops as late as 30 years after a fracture involving the epicondyles of the humerus. In these cases the ulnar nerve becomes injured from impingement between the messal condyle and olecranon as a result of the deviation deformity which results from malunion or from arrested growth from one of the epicondyles, particularly the external one

3 Certain factors greatly increase the likelihood of growth disturbances and often cer-

tain of them are avoidable

a Infection—growth was arrested in every instance in which infection occurred, 4 cases

b Trauma—repeated manipulations and rough handling unquestionably increase the incidence of grow th irregularities and should be avoided or minimized. Complete anatomical reduction should not be insisted upon in the presence of a satisfactory reduction if its accomplishment increases greatly the risk of damage to the cartilage. Open operation resulted in growth disturbances in 4 out of 5 cases. Fortunately, separated epiphyses usually reduce very easily. Incompletely replaced epiphyses may become completely replaced spontaneously and persistence of incomplete reduction does not necessarily result in a disturbance of growth.

 C Treation—damage to the epiphy seal cartilage from pins, nails, and other foreign material traversing the cartilage when used to fix fragments and to maintain reduction, results often if not invariably in disturbances of growth Growth was arrested in 100 per cent or all 3 cases in the authors' series, and it is probable that reduction could have been maintamed in all of them without use of direct Undoubtedly, internal fixation is frequently used unnecessarily Similarly, total, partial, or unilateral growth arrests develop when bone grafts are placed across the epiphyseal line or when fragments extend across it so as to establish bony continuity between the draphysis and the epiphysis

4 The types of deformities and their treatment have been discussed. It should be emphasized that the possibility of a growth disturbance should be anticipated at the time of injury and the need of special consideration of

the epiphyseal cartilage in the handling of fracture recognized

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CONGENITAL ABNORMALITIES-PHOCOMELUS AND CONGENITAL ABSENCE OF RADIUS

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fested in patients with rare congenital deformities and the discussion of such cases is usually well worth the time devoted to the subject A fetus with hands and feet but no arms or legs is known technically as phocomelus. The name is derived from the Greek "phoco" meaning seal and "melus" a limb The term

UCH interest is always mani

was probably suggested by the resemblance of the position and size of the hand to the flappers of a seal

There is no scientific term for congenital absence of the radius. It has been classified, however, as ectromelus which again is derived from the Greek "ectro" implying abortion and "melus" a limb Phocomelus is also a type of ectromelus

TERATOGENESIS

It is interesting to review the theories of the probable cause of severe congenital abnormalities. They can be very nicely divided into two groups, the germinal (or bereditary), and the external (or environmental) Many authors champion one theory and exclude all others This does not seem wise. It is more than likely that both theories are correct The fact that monsters may develop from one cause does not prevent them from developing from other causes

Hirst believes all monsters are probably produced by external influences upon normal ova In summarizing the present knowledge of the probable causation of monsters Hirst says "it is fair to state that faulty implantation of the ovum, probably due to insufficient preparation of uterine mucosa by follicular and luteal hormones, plus mechanical and chemical environmental influences must be held accountable, rather than inherent germ tendencies" He believes double monsters may be imagined as single ovum or identical twins which have not completely separated

The process of separation is attributed to delay in the implantation and nourishment of the ovum Hirst referred to the important work of Newman and Patterson with the o banded armadillo In this animal the fertilized orum lies quiescent in the uterus for 3 weeks prior to the formation of the placental attachment and always results in the birth of a monochorionic young of the same sex

Bagg reports experimental work to justify the environmental theory. He says the type of abnormality developed depends upon the time of application of the disturbing factors An experimental disturbance during the very early embryonic period produces, very likely, eye defects An identical disturbance acting somewhat later results in defective brain or bronchial system, and still later, in malformation of the viscera

Stockard says that the various disturbing agents producing the abnormalities all tend either temporarily to slow or almost completely to stop the development rate

If the rate of development of an embryo is reduced for a limited period, then that part of the body which at that time normally would be developing the fastest is chiefly affected Thereafter it is never able to regain its normal rate of development in proper relation to other parts of the organism and hence is defective

O'Brien and Mustard seem to think that the germinal theory is likely They report three monsters in one family all phocomelia but one with harelip in addition. The mother and father were double first cousins Adair also inclines toward the germinal theory He calls attention to the occurrence of similar deformities in identical twins, such as harelips He also refers to case reports of mongolian idiots Both members of fraternal or dichorionic twins are never affected while both members of identical or monochorionic twins are always affected

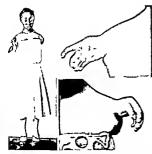


Fig. 1 left. Notice how the hands inserting directly into the trunk resemble the flippers of a seal. Fig. 2 right above \(^1\) near view of the right hand. The thumb is fixed in the palm of the hand in this position. Fig. 3 right below \(^1\) near view of the left hand.

Amnotic adhesions are now generally re garded as rarely if ever responsible for monsters A few years ago, however they were considered very important, and there are still some who attribute certain abnor malities to these amnotic hands

Attention should be called to the generally recognized ability of radium and therapeutic doses of roentgen ray to produce various de formities in the fetus

The modence of syphilis in a series of mal formations reported by Hirst is interesting In a series of 3,500 consecutive viable births 22 malformations were reported with an incidence of syphilis of 9,5 per cent Of 22 malformations 7 were sufficiently severe to be classed as monsters and of this group 2 were syphilitie. This gives an incidence of 29 per cent while the incidence of syphilis in the entire series was about 6 per cent

REPORT OF SIMILAR CASES

Phocomelus is an unusual condition The Index Medicus and the Quarterly Cumulative Index Medicus list only 3 case reports from the English and American literature since 1020 (5, 7, 8)

One of the most celebrated cases of pho comclus is described by Gould and Pyle and referred to by O Birton and Mustard The monster Marc Cazotte, commonly known as "Pepin," died in Paris about 1800 at the age of 52 from a chronic intestinal disorder "He had no arms, legs, or scrotum but from very jutting shoulders on each side were well formed hands His abdomen ended in a flattened buttock with badly formed feet attached. He was exhibited before the public and was celebrated for his devtenty. He per formed nearly all the necessary actions and exhibited skilfulness in all of his movements.

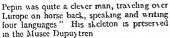


Fig. 4 Appearance of same patient from behind Fig. 5 Patient buckling left shoe with right hand

Fig 6 The patient is feeding herself with a poon in right hand



Fig 7 A roentgenogram of the right upper extremity a detailed description is given in the text



Congenital absence of the radius is comparatively much more common. Kato collected 253 cases reported in the literature up to 1923 and gives a masterly review of the subject

CASE REPORT OF PHOCOMELUS

Minne Marr is a colored girl 30 years old She has one brother who is entirely normal and no sisters. Here are no obvious deformities of any other member in her family. Minnie's pixents are not blood kin She bas the mentality of the average poor ignorant negro girl and has attended 1 year of school.

Minne uses her hands remarkably well. She dresses and undresses herself even to buckling or tying her shoes. She feeds herself without assistance. She mops or sweeps the floor and is able to carry out most of her household duties unassisted.

Vinnie has never been seriously ill Both Wasser mann and Kahn tests are strongly positive

Physical examination reveals a well nourshed muscular negro who is in good health and free of abnormalities except as mentioned below. There is a complete absence of both arms and both forearms. The hands a striculate with the truth, on both sides where the head of the humerus should be. The right hand is about a third larger than the left. Minnie is right handed and uses this extremity much more than the left. Both are a little smaller than we would expect in a person of her size (Figs. 10.6).

Motion in both hands is very free The entire hand can be flexed, extended rotated, abdueted, and adducted The motion of each finger is also free except for the thumbs Both thumbs are flexed and adducted in the palm, from which they can not be voluntarily moved

The roentgenograms of Minnie show very strikingly the absent arm and forearm. On the right side



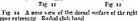
Fig 8 A roentgenogram of the left upper extremit) detailed description is given in the text

the scapula is small and poorly developed (Fig. 7) The coracoid process cannot be identified The acromion is elongated narrow and articulates at its tip with the poorly developed distal extremity of the clavicle There is no trace of a glenoid cavity Immediately distal to the clavicle and scapula and separated from them by soft tissue is a flat but very irregular bone measuring approximately 13/2 by 13/8 by 34 inches This bone cannot be definitely identified, by its size or shape. It seems to articulate distally with the carpal bones so that it might be interpreted as the lower end of the radius. The carpal bones are arranged in two rows-a proximal and a distal. All of the proximal bones are fused into one Faint lines can be seen which represent the point of fusion. The distal row of bones is also fused except for one in the position of the greater multangular No one bone or segment has the appearance of a normal carpal bone but the articu lation between the proximal and the distal row is very definite. The metacarpals and the phalanges are normal

The roentgenogram of the left upper extremity reveals a very small, almost infantile scapula (Fig 8) No glenoid fossa is visible but there is a small acromion which apparently articulates with a fairly well developed clavicle. The coracoid process is absent. Distally there is a small flat irregular bone measuring about 11/2 by 13/8 by 1/2 inches which seems freely movable and attached to the other bones only by muscles and ligaments More distally are the poorly developed and poorly differ entiated carpals. The most proximal one of which is a spherical bone about 1/4 of an inch in diameter which has none of the characteristics of any of the carpal bones Immediately distal to this and articu lating with it is an elongated bone apparently representing the remainder of the proximal row fused together Indefinite lines can be seen which represent the lines of fusion of these bones. The distal row is also fused except for a bone in the normal position of the greater multangular, but which does not resemble it. The metacarpals and phalanges are normal Measurements given for the above bones were taken from roentgenograms



Fig 9 Congenital absence of the radius
Fig 10 A near view of the palmar surface of the right
upper extremity Compare this picture with the roeatgen
ogram (Fig 13)



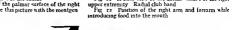






Fig 73 Roentgenogram of the right forearm and hand

Fig 14 Roentgenogram of the left forearm and hand.

On the right side a short cervical rib is present. The roentgenogram which includes the heart shadow gives the impression of a greatly enlarged heart. The heart is really not enlarged, the appearance is attributed to the technique used in taking the film.

CASE REPORT OF CONGENITAL ABSENCE
OF RADIUS

Robert Alred is a white boy 24 years old. He has several brothers and sisters who are all entirely normal. There are no obvious deformities in any other member of his family. His parents are not related by blood.

Robert was born in the vicinity of Clanton, Alsa bama. His deformity did not prevent him from leading a very active childhood. In high school rearms as halfact, on the first string foot that each and guard on the baskethal team. Bob has some and guard on the baskethal team. Bob has above the average intelligence. He is freedly and very popular in his community. He is in good health and has never been seriously ill. The Wassermann and Kahn tests are negative. At an early age he had some form of minor operation upon one of his forearms but no difference could be seen in the

deformity or function after the operation. He also had several operations for the correction of severe congenital (knock knee) genu valgum.

Physical examination reveals a white how well developed and well nourshed except as methoded below. There is a bilateral complete absence of the radius. The wrist is sharply abduted giving the position referred to as radial club hand. Motion of the hand is very free. Motion of the elbow joint is free (Figs. 9 to 12).

There is a moderate degree of genu valgum and numerous scars are present on the leg which repre sent the marks of former operations

The rocatgenogram reveals a complete ab ence of both radu. The ulnar is curved slightly forward and to the radial side. The carpal hones seem par tally fused but this can not be positively made out from the rocatgenogram. The metacarpal and phalances are normal (Figs. 13 and 14).

SUMMARY

Severe congenital abnormalities arise from hereditary and very early environmental causes The environmental causes probably act by temporarily slowing the growth of the fetus. The part or organ normally developing most rapidly during this time gets behind and never catches up as the rate of growth returns to normal

Cases of phocomelus and congenital absence of the radius reported in the literature are reviewed. One case each of phocomelus and congenital absence of the radius are reported by the author

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THE ENDOCRINE BACKGROUND OF THE TOXEMIAS OF LATE PREGNANCY

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O disease nor group of diseases has better mented the term "disease of theories than the toxemias of late pregnancy Every textbook on ob stetrics presents long lists of factors to which these toxemias have been ascribed. More over, there has been wide disagreement on methods of therapy. We seem to have been brought but little nearer the solution of the problem by the extensive investigation of the biochemical processes involved Inevitably this very fact must lead any thoughtful student of the subject to wonder if some new ap proach is not indicated-an attack on the problem made from a totally different point of view Flushed with its recent triumphs in the study of the physiology and pathology of sexual phenomena, endocrinology may be pardoned therefore for intruding into this neld A study conducted on a small group of cases such as is accessible to us can, of course, never be conclusive, but it may suggest some thing which larger centers can carry to a fortunate and decisive result

THE TWO TYPES OF SEVERE LATE TONEMIAS

If we remove from our minds, for the mo ment, all that has been learned so laborously about the classification of these late tovermas and their interrelationships, we can see that two climical types stand out pre-eminently. One is the group of cases ending in celampsia if sufficiently severe. The other is the group ending in abruptio placentar, if sufficiently severe All the milder forms of these types we have long lumped together simply as "tovermias" or "pre eclampsia" because we have had no sure and simple method of differentiating between them before they showed themselves full face. For the moment let us

From the Department of Obstetrics and Ganecolory Linser sity of Western Ontario Read at The Hamilton Academy of Victions September 9 1930 and at the Canadian Physiological Scorety Aingston October 9 1930 beg the question of the "low reserve kidnet,"
"essential hypertension in pregnance and
other such problems the matter of reno
vascular disease will be mentioned later

A little thought will suggest that it may be quite erroneous and misleading to use such a crude classification as "pre-eclampsia for cases which seldom go on to true eclampora whether managed skillfully or otherwise Most practitioners see many such cases of pre eclampsta, but only very, very few true eclamptics If pre eclampsia be so common why should eclampsia be so uncommon? We can scarcely flatter ourselves that we ward off the convulsive stage of these toxemias by our various and feeble therapeutic measures When we are brought face to face with a true full blown eclampsia, it is impressed on us very forcibly bow meffectual are our present methods to ward off further convulsions Is it possible that only a very few of these mild, non-convulsive, "late tovemia" patients are really pre eclamptics? Perhaps pre-eclampsia is almost as rare as eclamosia?

With this re-orientation of viewpoint as a beginning, let us turn to the full blown cases of eclampsia and abruptio placentæ, to see if recent researches distinguish fundamentally between them The Smiths demonstrated that both the blood and placentæ of eclamptic women were characterized by a low estrin con tent and an excess of the antagonistic pla cental or pregnancy urine gonadotropic hor mone Heim found in both eclamptics and abruptio cases a very high prolan as well as estrin excretion Bickenbach and Fromme observed no increase in the blood content of estrin in 4 cases of eclambsia Nicholson, since 1901, has noticed that the more normal was the thyroid gland the less likely was toxema to develop He stated that a woman was safe from toxemia if she were a hyper thy roid rather than a hypothyroid This con clusion seems very doubtful, however Hoff

mann and Anselmino have evolved a test for the presence of thy roid secretion in the blood. They found that in eclamptics the amount of this hormone was enormously increased but in pregnancy nephropathy it was much below normal. The significance of these observations on the thyroid becomes greater when the animal experimentation of Weichert and Boyd and of Van Horn is recalled. These workers showed that the administration of thyroid extract to animals increased the excretion of estrin. Moreover, Benazzi produced thyroid hypoplasia in rabbits by means of estrin inections.

Such observations indicate the intimate relationship of hypothyroid states to the accumilation of excess of estrin in the body, and something of the significance of such estrin excess. In 31 pregnant women studied by us, all of them patients in whom the estrogenic substance in the blood serum was at a level so high that it was difficult to control by means of wheat germ oil, fully 22 showed evi-

dence of hypothyroidism

Of late, the continental literature in particular has been marked by many references to cholin and its derivatives. These appear to be fundamentally related to the activity of the parasympathetic nervous system and the contractility of such smooth muscle as that of the uterus and gut The values for blood cholin in the two major types of late toxemia indicate an important difference between them Spath found that 4 women with pregnancy nephropathy displayed a slight increase of blood cholin, but 9 cases of pre-eclampsia showed a marked decrease and 8 of a cases of eclampsia gave unusually low values He observed other evidence to confirm his impression that labor in the true eclamptic is preceded by an actual cholin deficit Lufinger and Sprado were able to confirm this observation indirectly discovered in the blood in pregnancy and some other conditions an inhibitor to the action of yeast on certain monosaccharides. The values for this inhibitive agent were high when the cholin values were low, and proved to be high in eclampsia cases

The foregoing will indicate that there is a very real basis for distinguishing between the two main types of late to verma of pregnancy. To recapitulate, the abruptio tovemias exhibit a high blood estrin, the eclamptic a high prolan excretion. The former are characterized by a low blood content of thyroid hormone, the latter by a high content. The abruptio case has an elevated blood cholin, the eclamptic avery low cholin value. Years ago Holmes and Wilhams, as well as other clinicians of note, foreshadowed just such a fundamental division of the late tovernias on purely clinical grounds. Many writers have more recently indicated the rarity of association of abruptio and eclampsia, e.g. Baird, Le Lorier, Davis and McGee, and most recently De Snoo

Our own observations are of some interest in this connection. In our locality relatively few cases of true eclampsia are seen, but in the past 3 years 8 convulsive cases have been studied completely or in part by the author. Only 10 fithe 8 displayed any excess of estrogenic substances in the blood and, in the 1 case in which such a test was made, the prolan output in the urine was found to be very high. On the other hand, during the same period of time we have been able to study the blood sera of 39 cases of abruptio placentie of the severe type. Eighty-five per cent of these displayed an excess of estrogenic substance in their blood sera.

THE MILD LATE TOXEMIAS

Can the mild or incipient stages of toxemin of late pregnancy be similarly divided into the same two major categories? We believe it is readily possible, both by means of the laboratory analysis of their blood sem for the presence or absence of an excess of estrogenic substance (21) and by clinical means. This has been discussed at some length in previous publications (23, 24), but is here recapitulated briefly. The cases which show a tendency to premature placental separation and might be called pre-abruptos or mild examples of what the French have so aptly called hematome retroplacentare usually show the following

Tenderness—localized, recurrent, and truly uterine. It is first noted at the placental site or at the region of the origins of the round

ligaments

2 Backache—sacral region

3 Hemorrhage—fresh, bright red, utenne, not due to placenta previa. Too many physi-

cians seem to think hemorrhage is essential before the diagnosis can be made Many patients never display external hemorrhage

4 Small fetus—strikingly small for the duration of gestation. It should be pointed out that Zagami and Sindom found that the products of conception in E defective rats were unusually small.

5 Weight—maternal π eight increasing rap

6 Malaise-"indescribable" and marked

7 Albuminuma—slight or marked

8 Blood pressure—some elevation above the normal limit of the individual in question 9 Bleeding and coagulation time—in-

creased A similar increase of bleeding time was observed in cases of deficiency of the fat soluble vitamins A and D, by Kugelmass and Samuel, together with a great decrease of blood fibrinogen such as Dieckmann (8) found in cases of abruptio placentæ It is of great interest that the anti-hemorrhogic vitamin A recently discovered is also a fat-soluble vitamin.

10 Excess of estrogenic substance in the blood serum—for as long as 5 months beforehand

In regard to hemorrhage, De Lee stressed a very important point, viz, that a fatal intra uterine hemorrhage may occur without a trace of external bleeding. He also stressed the tender uterus and said he bad "rarely missed it."

On the other hand, the true "pre eclamptic" reveals

1 Albuminuma-often sudden and marked

2 Blood pressure—rising rapidly

3 Small fetus—as above

4 Visual disturbances

5 Nausea and vomiting

6 Headaches—often occipital and usually noticed promptly on awakening in the morn ing

7 Weight increase—and edema, or weight increase alone

8 Rarely an estrogenic excess in the blood serum

9 High unnary output of prolan—the authorities say it may be enormous

We have studied during the past 3 years 66 cases of the mild type of late toxemia which

we helieve were small retroplacental hematomas and 3 cases of true pre eclampsia Lighty two processes of the former revealed the excess of hlood estrogenic substance mentioned but the patients with pre eclampsia did not

It will be observed that cases of mild or severe retroplacental hematoma are not un common and outnumber cases of the eclamp sia type in our unselected group of cases of late toxema by 105 to 11 De Lee points out that small retroplacental and intraplacental bemor rhages occur frequently in late pregnancy and organize without producing alarming symptoms They are demonstrable only on careful inspection of the placenta after delivery. It will be noticed that the subject of abruption placentæ has been dealt with throughout with no more than a passing mention of nephritis That has been intentional It is obvious that the implications of these studies are of great interest in respect to nephritis, hypertension, and renovascular disease as a whole, but as yet we do not feel qualified to make any observations upon those themes

THERAPY

Experience has led us to believe that in pathological states characterized by an excess of estrogenic substance in the blood, such as spontaneous abortion and miscarnage, the administration of wheat germ oil bas therapeutic value (22) If these conclusions are correct, therefore, namely, that much the commoner of the late to remias, the type which may go on to abruptio placentæ, is usually characterized by this excess of estrogenic sub stance in the blood, then wheat germ oil therapy should be helpful De Lee succinctly remarks that abruptio placentre is really an abortion at or near term, and those who bave tned wheat germ oil in treating abortion are convinced by this time of its efficacy. On the other hand, a preparation of vitamin E should have little or nothing to offer in the treatment of the much rarer cases of true pre eclampsia or eclampsia Such proves to be the fact, and one need try this therapy but a few times to be convinced of it

The wheat germ oil used must be potent, kept cold from the time of manufacture, and should not be more than 8 weeks old Enough of it must be administered to "saturate" the patient with vitamin I (22) and maintain that saturation The true pre-abruptio type of toxemia or any abruptio case not hopelessly out of hand will respond promptly Inside of 24 hours the blood pressure of such a patient returns to normal or falls markedly This is true of both the systolic and diastolic pressures, unless the hypertension is of months' standing and the Lidneys already show signs of marked damage. The alhuminuma decreases or disappears, the weight gain often reverts to a normal rate, the uterine tenderness, sacral backache and hemorrhage promptly cease, the feeling of indescribable discomfort and malaise vanishes women have a sudden and excessive polyuma on taking the oil and lose their edema rapidly Moreover in a few weeks there sometimes appears to he an unusual increase in size of the fetus Such an observation was also made by Maxwell in cases of deficiency of vitamin B in pregnancy upon treatment with the indicated vitaimin. The response to wheat germ oil therapy is very dramatic

In more marked cases of toverma of the same type, wheat germ oil therapy has less to offer For example, when the hypertension is well established it is little altered by this treatment. But if the patient is saturated with the oil, small hemorrhages cease. (We histen to add that we have not yet tried our type of treatment on a profusely bleeding patient.) The placenta appears to adhere sufficiently well to render safe the induction of labor and the delivery of the child These conclusions about the results of this theripy in the severest case of abruption placente are, we reiterate, now merely tentative

The effect of the oil therapy on cases of retroplacental hematoma is so dramatic and this type of case so common that there is no need to cite case reports to illustrate what occurs. One will be convinced most readily by actually treating such a case in the manner suggested. Certainly we have seen no mild case of retroplacental hematoma recognized early and treated adequately with potent wheat germ oil go on to the classical, severe type of premature placental separation with gross shock, and hemorrhage

One of the most important results of this study has been to differentiate acute appendicitis in pregnancy from abruptio. It is not unusual to see a patient during middle or late pregnancy develop a sudden, severe, right lower quadrant pain with so many signs and symptoms suggesting acute appendicatis that operation seems to be urgently demanded De Lee recalls three such confusing cases However, a careful examination to determine if the abdominal tenderness is actually in the uterine nail or to the right of the uterus may make it clear that the placental site is really producing the symptom complex. When in doubt, and some delay is not contra-indicated, the therapeutic test of administering a massive dose of 8 to 12 drams of wheat germ oil is conclusive. On four occasions we have seen such cases, and twice were able to avert uscless and even dangerous surgical intervention The palliative effect of a massive dose of wheat germ oil is so striking that even an im-

patient surgeon can be promptly convinced What has this study to offer in the way of treatment for the true pre-clamptic and eclamptic type of late tovenna? Our chinical material is too limited to permit a suitable answer to that question. However, we have recently treated 3 such cases with estim with good results (25). That suggests that therapy hased on the antagonism of estim to the prolain which is excreted by eclamptics in such large amounts offers some promise.

SUMMARY

The late tovermas of pregnancy may he grouped, from an endocrnological point of view, into two principal categories, viz those which are eclampsia, real or impending, and those which are retroplacental hermatomas or ahruptio placente, real or impending

2 These groups may be differentiated by the fact that the former excrete a great excess of prolan and the latter are marked by an excess of estrogenic substance in the blood 3 Similarly, studies of thyroid activity and of blood cholin values give further reason for such a fundamental division of the late

4 The abruptio type exceeds the eclamptic type by about nine to one in our small series

We have found that wheat germ oil is a prophylactic and therapeutic agent of great value in treating the abruptio group

6 There is some reason to suspect that estrin therapy may assist in the therapy of the eclamptic type

Since this paper was prepared and presented a number of reports have appeared which lend some support to the conception it advances of the division of the late tovernas of pregnancy into two groups only one of which is true preeclampsia and eclampsia Pastore has reported studies of blood-cell volume Dieckmann (9) general blood studies and Boyd studies of the phospholipid-cholesterol ratio in the blood which tend to this same general conclusion Boyd indeed found much as we did that only to per cent of these late toxemias were really pre-eclampsia Dieck mann and Michel (10) found a notable difference in the reaction to pituitary extract of true pre eclamptics and those pregnant patients with vascular renal disease. Robson found that when 12 severely touc pregnant women were treated with progesterone 1 of the 12 reacted very differ ently from the rest and was not benefited at all When all the similarities between wheat germ oil and progesterone are considered this fact becomes significant

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HEMORRHAGE INTO THE PLEURAL CAVITY

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THE surgical problem of penetrating wounds of the thorax and hemorrhage into the pleural cavity is asold as warfare between men From generation to generation, since the earliest times, it has presented itself to the surgeon and has always heen and still is a common injury. Hippocrates helieved that blood in the pleural cavity always putrefied and formed pus. In the thirteenth century, Guy de Chauliac stated that some contemporary surgeons practiced primary closure of a thoracic wound, while others believed that it should always be left open and eventually dilated and drained. He closed the wound immediately and governed his subsequent treatment by the indications presenting in the particular case If the course was favorable, he was content, but if dyspnea or sepsis followed he opened the wound and evacuated the blood and pus, packed it between evacuations, and eventually inserted a drainage tube. This practical method, modeled on the Hippocratic treatment of empy ema, permitted many to recover without complications and, when complications did develop, met them, but avoided the serious one of an early open pneumothorax Ambrose Paré followed the same practice Laennec stated that the wound should be closed so that the pressure of the accumulating blood in the pleural cavity would control the hemorrhage Trousseau advised strongly against aspiration, and for the same reason

The development of aseptic surgery and of surgery of the thorax eventually made immediate operative interference a feasible procedure and during the great war early wide thoracotomy with direct control of bleeding and evacuation of blood was frequently practiced. One of the most important wartime developments was made by Morelli of the Italian army who used early pressure pneumothorax to control the bleeding and to permit healing of the wounds in the lungs. In 1933, Connors and Steinbruch reported excellent

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results in a large series of patients submitted to immediate operation. Their procedure was to make an incision into the pleural cavity through the wound of entrance, to ligate the intercostal artery proximal and distal to the wound, and to suture the wound in the lung to the chest wall.

My reason for writing on the subject is not to report a large series of cases, but rather to discuss the complicated physiology of hemorrhage into the pleural cavity and to report certain original observations on its effects upon the blood pressure, effects which can be detected clinically and which are important in determining the indications for treatment

I shall start by reporting a case which illustrates many of the important points

Miss E C was seen in consultation with Dr O'Neill at the Evanston Hospital on August 4, 1931 Five days previously in an automobile accident, she bad suffered a severe injury to the right side of the thorax A roentgenogram showed that five ribs on the right side were broken and that the right pleural cavity was filled with fluid and air For the first few days the temperature was elevated to from 100 to tor degrees F It then fell to 98 degrees F, and at the same time the pulse rate rose from 110 to 120 When I first saw the patient she presented a picture characteristic of traumatic shock. There was marked pallor, the extremities were cold and the body was covered with beads of perspiration. The pulse rate was 120, and the respiratory rate 26. Breathing was shallow and grunting The pulse, which was ex tremely small, disappeared almost completely on inspiration

The blood pressure on expiration was 102 systolic and 72 diastolic During inspiration no reading could be obtained at any level. The pressure in the pleural cavity was plus 28 centimeters of water After 525 cubic centimeters of pure blood bad been removed, the pressure in the pleural cavity was lowered to ir centimeters, and a definite and dramatic change was produced in the patient's condition. The pallor disappeared, the extremities became warm, and the sweating stopped abruptly. The pulse in creased in volume, and the rate fell to 100 The expiratory blood pressure rose to 112 systolic and 72 diastolic The inspiratory pressure was now oo By the next day the original symptoms and signs bad returned The expiratory blood pressure was 84 systolic and 60 diastolic There was no inspira tory pressure. The pressure in the pleural cavity was

plus 12 centimeters of water After the removal of 900 cubic centimeters of blood, air was injected into the pleural cavity until the pressure was plus 8. The picture was again reversed the blood pressure was then 112 systolic and 65 diastolic

In this case of traumatic hemopneumo thorax the patient was in a chronic state of circulatory collapse (low blood pressure) 5 days after the mjury. While the expiratory blood pressure was practically normal, the inspiratory pressure was too low to be recorded and it was obvious that the mean pressure was below the shock level. The immediate response to aspiration of blood indicates that the high intrapleural pressure and the discrepancy hetween the inspiratory and expiratory blood pressures were important factors in producing the clinical picture.

This evaggeration of the normal respiratory waves in the blood pressure is a constant effect of high intrapleural pressure I have observed it in pleurisy with excessive effusion and in spontaneous and artificial pneumo thorax It occurs also in acute pulmonary

edema and perhaps in some other conditions. When blood escapes into the pleural cavity, normal cardiorespiratory physiology is at tacked from two angles. The progressive decrease in blood volume is complicated and aggravated by collapse of the lungs and by pressure upon the heart and great veins Either of those conditions may cause death Combined they supplement each other.

The hemorrhage produces (1) a progres sive decrease in blood volume, (2) a progres sive decrease in cardiac output, (3) a progressive fall in hlood pressure, (4) shock and eventual death from lack of oxygen supply to

the vital nerve centers
Pressure in the pleural cavity produces
(1) a progressive collapse of the lungs and
decrease in vital capacity, (2) an increased
resistance in the pulmonary circulation, (3)
pressure upon the heart and great venic,
(4) interference with the return of shood to
the heart, (5) a rise in venous pressure, (6) a
decrease in cardiac output, (7) a marked exaggeration of the respiratory variation in
blood pressure, (8) eventual death from a
practically simultaneous respiratory and cir
culatory failure

The two conditions supplement each other as follows

- I Collapse of the lungs decreases the oxygen saturation of the blood, the volume of which has been decreased by hemorrhage, and so continuities to the failure of oxygenation of the vital centers
- 2 Pressure in the pleural cavity obstructs the return of venous blood to the heart. This hindrance is more effective and serious if the venous pressure is already lowered by a de crease in blood volume.
- 3 Both the obstruction to venous return and the decreased blood volume diminish the cardiac output
- 4 The evaggeration of the respirator, waves of blood pressure tends eventually to lower the mean blood pressure and so to aug ment the similar effect of decreased blood

From these considerations it is obvious that an individual can tolerate a higher intrapleu ral pressure if his blood volume has not been decreased by hemorrhage, and that he can stand a greater decrease in blood volume if his respiratory and circulatory systems are not compromised by a high pressure in the pleu ral cavity.

The escape of blood into the pleural cavity is practically always associated with the si multaneous escape of air so that one is con fronted with a hemopneumothorax rather than a simple hemothorax This is of great clin ical importance because the relative amounts of blood and air determine which picture will predominate, that of hemorrhage or that of intrapleural pressure, and which condition must be treated A valvular pneumothorax without hemorrhage may produce death in less than an hour from simple intrapleural compression Since the pressure in the sys terme artenes (120 mm of mercury) is much above what can he tolerated in the pleural cavity (30 cm of water) a relatively small hemorrhage into a large pneumothorax will cause death chiefly by raising the intra pleural pressure On the other hand, if there is no pneumothorax or only a small one, hemorrhage into the pleural cavity will cause death from a decrease in blood volume before the factor of intrapleural pressure becomes in

trinsically important In every case, however,

both factors are important

Before speaking of the treatment it seems hest to consider the clinical aspects of the two conditions, as seen separately and combined, and to point out the symptoms and signs by which one can tell which is the most important and toward which, accordingly, the treatment must he directed. The clinical picture of acute bemorrhage is too well known to require description. Pallor, thirst, restiesness, and sweating, and a rising pulse and falling blood pressure are its outstanding features. Dyspinea and air hunger are late—almost terminal phenomena—occurring only when the blood pressure has become extremely low.

Rapidly rising pressure in the pleural cavity produces symptoms which are chiefly respiratory Dyspnea appears early and cyanosis is the result of incomplete oxygenation of the blood and of the increase in venous pressure The type of breathing is characteristic the pressure rises, the thorax becomes dilated until the limit of expansion has been reached Because it cannot be enlarged further by inspiratory efforts, expiration becomes active, the patient forcing the air out hy a grunting expiration. Air is drawn in by a passive rebound into the dilated position Sauerhruch and Nissen have called attention to the fact that immediately following thoracic trauma vagal stimulation may cause a slow full pulse which masks the senousness of the miury This is a transient effect and, if pressure develops, gives way rapidly to a rise in pulse The blood pressure remains at a safe level but exhibits an increasing discrepancy hetween the inspiratory and expiratory levels

When acute bemorrhage is complicated by a rising intrapleural pressure, a falling blood pressure indicates a predominance of the former, while rapid labored grunting respiration, cyanosis, and an evaggeration of the respiratory waves of the blood pressure indicate that the intrapleural tension is dangerously in

creased

THE TREATMENT

Because either the blood loss or the intrathoracic compression or a combination of the two can cause death in a short time, a patient

suffering from acute hemopneumothorax demands extremely close observation until his condition has hecome stationary at a safe level. Until that time one must watch the indications and be ready to increase the blood volume or decrease the intrapleural pressure or, if these fail, to perform an emergency operation

The falling blood pressure and the rising intrapleural pressure must be relied upon to stop the hemorrhage, and consequently should be altered only when they become dangerous If the patient is seen early, artificial pneumothorax may be used in an attempt to stop the bleeding In general, one can say that a blood pressure falling helow 80 millimeters of mercury is an indication for transfusion, while severe dyspnea with markedly exaggerated Traube-Hering waves calls for aspiration of blood or air from the pleural cavity. One must remember that an unduly low inspiratory pressure may drop the mean blood pressure below the critical level, while the expiratory pressure remains well over 100 He must also remember that both phases of the picture may be improved either by increasing the blood pressure or by lowering that in the pleural cavity Either will both raise the blood pres sure and alleviate the symptoms of compression

One of the striking and unexplained aspects of the condition is that blood in the pleural cavity does not clot—either in situ or after it has been aspirated. Theoretically, one should be able to use the patient's own blood for transfusion and by repeated aspiration and reinjection maintain both the pressure in the arteries and in the pleural cavity at safe levels for an indefinite penol. In the first few hours, before infection has had time to develop, this procedure is sufficiently sound theoretically to warrant trial.

Once the stability of the blood pressure and respiration indicate that bleeding has stopped, nothing further should he done for 48 hours. Too early relief of pressure may reopen the wound in the lung or cause a recurrence of bleeding. At the end of 48 hours, blood may be aspirated and replaced by air, and this procedure repeated on successive days until the hemopheumothorax is converted into a

simple pneumothorax This should be maintained for at least 2 weeks to permit the wound in the lung to heal

Blood in the pleural cavity will usually absorb spontaneously but occasionally will produce a calcification of the pleura which prevents re-expansion of the lung and predis

poses to late complications

Infection of the pleural cavity is surprisingly rare. If persistent and using fever and positive cultures of aspirated material indicate that it has occurred, drainage must be established. Because in most cases there are no adhesions and the lung is completely collapsed and the meditatinum mobile, the closed method is imperative.

SUMPLARY AND CONCLUSIONS

- When bleeding takes place into the pleu ral cavity the cardiorespiratory mechanism is attacked from two angles
- 2 The effects of decreased blood volume are supplemented by tho e of high intrapleu ral pressure
- 3 Both of these act to decrease the cardiac output and to compromise tissue respiration
- 4 One of the constant effects of high intra pleural pressure is an exaggeration of the respirator, waves of the blood pressure

- 5 If the blood pressure is lowered by bem orthage the further fall during inspiration may lower the mean pressure below the critical level
- 6 Because the two conditions supplement each other, the patient's symptoms, both res piratory and circulators, may be reheved by either increasing the blood volume or decreaing the intrapleural pressure.
 - 7 The predominance of circulatory or res piratory symptoms depends upon the relative amounts of blood and air in the pleural cavity 8 Because the falling blood pressure and
- the rising pressure in the pleural cavity act to stop the hemorrhage, treatment should be expectant until either circulators or repiratorsigns and symptoms indicate danger
- 9 Blood transfusion or aspiration of air or blood from the pleural cavity should then be applied as indicated
- To Because blood in the pleural cavity does not clot and rarely becomes infected, aspiration and infusion of the escaped blood is suggested as a reasonable form of treatment.

Note —Bunng the past mouth I have had occason to transfuse a one cam, of blood directly from the Print cavity into the sein. This was done in a case of postope, a time benomings following interpleural pneumofrax, a nationarulants were used and no untoward complications developed.

SUBTOTAL GASTRIC RESECTION FOR PEPTIC ULCER

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HILE an increasing number of surgeons are advocating subtotal gastric resection as a routine pro cedure for cases of peptic ulcer, many are still satisfied with the results of the palhative operations such as gastro enterostomy, especially for duodenal ulcer Nevertheless all gastric surgeons use resection for certain types of ulcer such as pylonic ulcer with a suggestion of cancerous change, and for marginal ulcer When any such technically difficult surgical procedure becomes more widely used, the average results become less satisfactory This is natural as more surgeons attempt a procedure with every detail of which they are not familiar, and may even not have grasped the fundamental principles on which the operation was designed There are two very important factors in gastric surgery, first, the ability to relieve the patient of all symptoms permanently, second, the mortality following such operations

The purpose of this paper is not so much to add to the controversy regarding the choice of operation, but rather to discuss resection from the point of view of mortality. Advocates of resection believe that the chronicity of ulcer is due to the corroding action of the acid chyme and that the way to cure the ulcer permanently is to remove as much as possible of the acid secreting portion of the stomach so that achlorhydria or bypo-acidity remains This means a subtotal resection with the removal of two-thirds to three-quarters of the stomach Surgeons who remove little more than the pylonic antrum (the alkaline secreting part of the stomach) and expect a high percentage of 5 year cures, will be woefully disappointed, and the figures will be used by others to discredit the procedure. In every large general hospital where many surgeons are operating, the difference in technique between the various surgeons is quite striking. and these differences must be reflected to

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some degree in the mortality and the endresults

In a recent article, George Heuer gives a classification of the operations he prefers for various types of peptic ulcer For example he prefers a pyloroplasty for an ulcer on the anterior duodenal wall, a gastro enterostomy for an operation on the posterior wall, or if adhesions be present, also a gastro enterostomy for the calloused ulcer, occasionally a resection will be required. In bleeding cases the duodenum should be opened and the vessels sutured For pylonic ulcers, pyloroplasty is suitable, for those higher up, excision and gastro-enterostomy, or pylorectomy the ulcer is near the esophagus, gastro-enterostomy alone is sufficient. He states that the surgeon must approach each individual case with no preconceived ideas of the method he will employ For jejunal ulcer following Billroth I type of resection, he recommends a posterior gastro-enterostomy with carefully regulated diet "as there is no assurance that a marginal ulcer will not form" For a marginal ulcer following a posterior gastro-enter ostomy be advises disconnection of the anasto mosis and excision of the jejunal ulcer with further strict future medical control other cases of marginal ulcer he recommends gastric resection These suggestions appear to complicate unnecessarily what should be a simple problem

Almost every medical treatment of gastric ulcer aims at lesseming the acidity. Most of the operations endeavor to accomplish this same thing It is generally recognized that ulcer is not a localized condition like a furuncle, but rather the objective finding in a systemic disease. Ulcer patients always have a gastritis, they almost always have byper acidity, the acute exacerbations usually occur during periods of worry and overwork. A pylorectomy should never be done. It is a physiologically unsound operation as it removes the alkaline mucus secreting portion of help the hyperacidity and will be followed by a high rate of recurrence. It has been given in most clinics. Gastro enterostomy exposes the jejunal mucosa to the irritating digestive juices of the stomach against which it has no natural defence. There is no doubt that marginal ulcers are much commoner than some reports suggest.

It is prohable that the etiological factors producing peptic ulcer are constant, and that hyperacidity is one of the most important of these factors Wright, in a collective enquiry by the Fellows of the Association of Surgcons of Great Britain into gastric jejunal ulceration, in a follow up of 436 patients who had resection for gastric carcinoma, found none developed secondary ulceration. This is presumably because of the achlorhydria present in these cases Most gastro enterologists doubt the curability of an ulcer patient who has a very high acidity, and most surgeons insist on a careful postoperative medical regimen if hyperacidity remains. They fear a recurrence

The surest way of overcoming hyperacidity is excision of the acid secreting portion of the stomach, that is, the body, and in practice resection of two thirds of the stomach accomplishes this in the vast majority of cases. In addition to this, resection furnishes everything that can be expected from a gastroenterostomy inasmuch as the stomach empties more quickly and some regurgitation of alkaline duodenal contents may occur.

Resection has heen so invaluable in those cases of persistently recurrent ulcer following repeated previous operations that its place is recognized in this field hy all. If it is good for the most intractable cases, it stands to reason it is equally useful for all cases. This is because it is a physiologically rational procedure.

The objections mainly heard to the routine use of resection are that the mortality is higher, anemia may follow and that it seems a shame to remove so much stomach for such a little ulcer. The last is purely a sentimental reason and can he ignored, as the ulcer is only a local sign of a diseased stomach.

The question of mortality is of great importance. If it cannot be kept below 5 per

cent the operation must be abandoned excent in exceptional cases. In complicated cases such as marginal ulcer following a gastroenterostomy, or a colicogenunal fistula, the mortality will naturally he high, hut in simple uncomplicated resections the mortality can be kept between 2 and 3 per cent This is a lower mortality than will he found when all ulcers are treated by a medical regimen. To attain such a low mortality the technique must be foolproof The causes of death are usually postoperative shock, chest complica tions (collapse, pneumonia and empyema), leakage of the stoma and pentonitis, obstruc tion, victous cycle, hemorrhage, evisceration with later obstruction, and rupture of the duodenal stump

Causes of failure to relieve all gastro in testinal symptoms may be cited as small stomach symptoms, poor functioning of the stoma, recurrence of the ulcer, occurrence of marginal ulcer, and occasionally, perhaps, gastrocolic or jejunocolic fistula

If surgeons could avoid these things, the mortality would be strikingly low, and the cures very high. The main purpose of this paper is to discuss, these possible misad ventures with a view to their control. It will be simplest to discuss them under the headings of pre-operative care, anesthetic, technique of operation, and postoperative care.

Pre-operative care is only occasionally of unusual importance. If emacration is present, or marked anemia from one or more hemor rhages, or pylone stenosis, special preliminary treatment must be taken.

If beart, lung, or kidney conditions are present which make major surgery unsuit able, it may be advisable to refuse operation, or to be satisfied with a merely palliative procedure, such as pyloroplasty

For the average patient, well nourshed, with a hemoglohin percentage of over 80, not complicated by pylone obstruction, special pre operative preparation is unnecessart. Extra glucose should he given for two days before operation to huild up a gly oogen reserve, and the stomach should be empty at operation. This usually occurs if nothing is administered by mouth after 6 pm the preceding evening.

When the patient is anemic, or emaciated, every effort should he made hy extra feeding. intravenous glucose saline, and transfusions. to huld up the patient's general state in order to turn a poor risk into a good one. In the presence of pylonic obstruction, a nasal catheter should he inserted into the stomach and repeated lavage carried out in order to empty the stomach and lessen the dilatation Often, after a few days of this treatment, the spasm and edema of the pylorus will subside, the obstruction will be overcome and further cure will greatly improve the general condition of the patient After prolonged obstruction, repeated transfusions may he required hefore the patient is ready for operation

I have used transfusions but rarely in the ordinary cases, either hefore operation or after, hut in emaciated or markedly anemic patients their repeated use must he insisted

upon

Anesthesia The next important consideration is the choice of anesthetic While local anesthesia is the anesthesia of choice, it is difficult to employ in many patients. The procedure is too nerve racking for both patient and surgeon High nupercaine spinal anesthesia, followed by a later splanchnic nerve block, works almost as well. With this anesthetic also postoperative shock appears to be climinated. The patients leave the operating room in about as good condition as they enter it, the pulse rate and blood pressure being approximately the same Reports are frequently published showing a high percentage of chest complications following spinal anesthesia Chest complications may occur comparatively frequently, but are almost invanably not senous. A severe postoperative pneumonia is almost unknown in our senes Spinal anesthesia further gives such perfect relaxation of the abdominal wall that the technical procedures are made much easier

Splanchine anesthesia appears to play a definite part in preventing shock. Whether because it prevents afferent autonomic impulses I cannot say. It certainly lessens the gagging and straining which so often occur when traction is made upon the stomach. The method used is simple. About 60 culic centimeters of 0 5 per cent novocain, with adren-

alm, are injected retroperitoneally against the body of the twelfth thorace vertebra, above the lesser curvature of the stomach, the needle entering between the aorta and the inferior vena cava. If the anesthetic wears off hefore the end of the operation, gas and oxy gen anesthesia should he added. Cyclopropane anesthesia appears to increase bleeding.

With spinal anesthesia there is sometimes a considerable fall in blood pressure which may worry the anesthetist, but this gradually returns to normal during the operation. If it falls too low the head of the table should be lowered, and intravenous glucose saline administered.

Technique Detailed descriptions of the technique of gastric resection can he found in any of the larger works on surgery. The purpose in this paper is rather to emphasize such points as are felt to he of importance in lowering the mortality and in making a stoma which will work.

A midline incision from suphoid to the left of the umbilious is very satisfactory. It is quickly made, is almost bloodiess, and if sutured carefully is only rarely followed by hernia The appendix can he removed if desired, and the abdomen then explored If an uicer is found I resect unless this does not seem advisable hecause of unusual conditions If no ulcer is found after a thorough exploration, including opening the stomach and duodenum widely and examining the mucosa thoroughly with the aid of a Cameron light, close up and call it a day, or do a simple pyloro plasty if pylone spasm appears to have been the cause of the symptoms Operations for ulcer in the absence of ulcer do not cure the symptoms and are usually a hoomerang which comes hack to discredit surgery

The first step when resection is decided upon is to bring up the jeunum into the wound and place a holding suture in it 3 inches below Treitz's hgament. A slit is then made in the mesocolon to the left of the midcohe artery and holding sutures are placed in each side of the slit. The transverse colon and small howel are now placed hack in the abdominal cavity and covered with a warm most sponge.

If one resects for cancer it is important that the omentum he removed For ulcer the omentum must be carefully freed from the stomach in such a way that its blood supply is left intact, this means that the branches between the gastro epiploic and the stomach must be ligated separately but the gastro epiploic vessels themselves must not be damaged. The old method of tying the omentum in a few large bites leaves the omentum with out adequate blood supply, if large it becomes cyanosed, and the trauma to it may be a cause of later shock.

The omentum is freed right down to the pancreas from the greater curvature and up to the bare area where the right and left gastro epiploic vessels meet. The pylorus and duodenum are then freed on the lesser curvature.

A simple way of inverting the duodenum is to make an incision round it down to the mucosa and to strip back the serosa from the mucosa Place a pursestring suture half an inch below the edge of the stripped back area. doubly ligate the duodenum over the stripped mucosa and incise with a cautery between the ligatures The distal stump is then inverted by the pursestring suture. This is further in verted by one or two continuous sutures and the stump is covered with loose peritoncum from the edge of the pancreas This places the stump retroperitoneally and helps to localize small leaks so that an abscess is formed rather than general peritonitis A gauze or protective covering is tied over the stomach stump to prevent soiling

The stomach being used as a retractor, the lesser curvature is now cleared up to and in cluding the left gastric artery. With the help of a De Petz sewing clamp, about two thirds to three quarters of the stomach is removed. The rule is "When in doubt as to how much to remove, remove more rather than less." If the stomach is dilated, a greater proportion of it must be removed as it is the antrum which dilates most.

Choosing a point about the middle of the stomach stump, two holding sutures are inserted, taking good bites of anterior and posterior wall of the stomach. These sutures are held until the whole anastomoss is completed. The rest of the stomach between these sutures and the lesser curvature is now closed and inverted in two layers. The lesser curvature angle is most readily inverted by a U inversion suture running round the end.

The leiunum is now brought through the sht in the mesentery The ligament of Treitz can be cut to prevent kinking of the jejunum at this point. The left edge of the slit in the mesentery is sutured to the posterior wall of the stomach, and the rerunum anastomosed to the stomach opening between the holding sutures and the greater curvature Locking every stitch on the posterior layer, with a baseball stitch for the anterior wall, prevents hemorrhage A scratch mark on the anti mesenteric border of the jejunum is useful to prevent rotation during anastomosis no loop anastomosis is made, the proximal end of the anastomosis being less than 2 inches from the ligament of Treitz This prevents possible kinking and torsion of the pmumal loop Two layers should be used in the anastomosis, and if it does not look perfect a few interrupted silk sutures can be inserted to cover any imperfections

At the so called "fatal angle" where three suture lines meet. Finsterer's angle suture is valuable. He advises taking in a good bite of anterior and posterior wall of the stomach and two bites in the jejunum. This closes off the dangerous angle A second similar suture is inserted beyond the first, nearer the lesser curvature This not only prevents leakage at this point, but brings the jejunum up on to the closed portion of the stomach so that retrograde filling of the duodenal loop from the stomach is a voided These two sutures there fore prevent leakage at this most dangerous angle, and prevent rupture of the duodenal stump due to retrograde flow-two common causes of death following gastric resection Another similar smaller suture is placed in the stomach and jejunum to protect the other angle at the greater curvature. The right edge of the slit in the mesocolon is sutured to the anterior wall of the stomach Another purse string suture takes up the opening in the an terior layer of the omentum and fastens it up to the gastrohepatic omentum, giving addi tional support to the omentum

Except for the continuous sutures in the actual anastomosis where catgut is used, inc

silk is used throughout. There are several steps in the above description which may be emphasized.

i Burying the duodenal stump behind the peritoneum belps to localize infection if leaking should occur and to delay or prevent general peritonitis

2 The double pursestring suture about the "fatal" angle absolutely prevents leakage

3 Ligating the branches of the gastroepiploic vessels protects the blood supply of

the omentum and lessens shock

4 The no-loop anastomosis, together with bringing up the afferent loop over the closed end of the stomach stump prevents retrograde filling of the duodenum and also torsion and volvulus of the duodenum and jejunum forming the loop

5 The anastomosis is situated in the greater peritoneal cavity, thus lessening dan-

ger of death if leakage should occur

6 The baseball and locked anastomotic

sutures prevent bemorrhage

This technique is satisfactory for simple ulcers, but in complicated ulcers new problems present themselves. Where the ulcer is penetrating adjacent viscora they should be dissected off and the bed of the ulcer left intact. In these cases a drain should be inserted, especially if the ulcer penetrates the pancreas A quantity of pancreatic secretion, if allowed to collect, might digest the suture line and cause a perforation

When a large duodenal ulcer is present it may be impossible to resect below it without endangering the common duct. In these cases Inisterer's operation for exclusion is invaluable. The stomach is incised above the pylorus, leaving the ulcer in situ. The stump can be easily closed by dissecting away the mucosa and suturing the raw edges together. The ulcer removed from the digestive action of the gastine juice will promptly beal.

If the stomach ulcer is so high, or near the esophagus that one cannot resect above it, resect below it, taking away as much stomach as possible, but ensuring that the anastomosis be made in healthy tissue

When dealing with a marginal ulcer, two methods are available. The first is resection of the stomach and that portion of the

jejunum involved. The jejunum is reunited by end-to end anastomosis, and then the jejunum is anastomosed to the stomach as described above. The mortality for this operation is naturally higher.

Dr F A C Scrimger has designed an operation he considers safer, following the idea of Finsterer's operation for exclusion. He cuts around the stomach an incb or more above the stoma, dissects out the mucosa down to the jejunum, and closes the cuff of stomach serosa, accompanying this with a resection. While this, like Finsterer's operation for exclusion, is often a splendid and life-saving prodecure, I think it is a good rule to follow that the ulcer should be removed, if possible. Ulcers left in have been known to bleed and even to perforate during the early postoperative days.

In cases of gastrocolic fistula, do not resect the colon if it can be avoided Resection of stomach, jejunum, and colon is always a hazardous procedure. If the colon can be dissected off the uleer and the opening can be inverted, this should be done Great care must be taken to prevent soiling. If the colon has to be resected a loner mortality will probably be obtained if the ends of the colon are brought out of the wound after being sutured.

together to form a spur The colostomy can

then be closed later This has been advocated

by Lahey in all large bowel resections, and he claims a very low mortality

Infection from opening the stomach or duodenum in ulcer cases with high acidity is a rare occurrence, and one need never hesitate to open the stomach freely to explore it for a doubtful ulcer

Postoperative care On return from the operating room the patient is kept warm and immediately given 1000 cubic centimeters of 5 per cent glucose saline intravenously Sufficient morphine is given to keep the patient comfortable. The glucose saline infusions are given twice a day until the patient is able to take sufficient fluid by mouth to maintain his fluid balance. Nothing is given by mouth for 24 hours, then 1 ounce of water is given every hour during the second day, 1 ounce every hour during the third day. After this the diet is gradually increased until by the tenth

day the patient is on restricted diet, with extra feedings between meals. He may get up on the twelfth day and go home on the fourteenth on full diet. Most of our patients go home on the twelfth day.

The carbon dioude rebreathing bag is given routinely for a few minutes several times a day for the first few days to ensure lung ventilation and to prevent postoperative atelecta sis, the precursor of postoperative pneumonia A nasal catheter is inserted at the slightest sign of nausea, vomiting, or epigastric fullness

If these methods be exactly followed the mortality can be kept down to well below 5 per cent and in uncomplicated cases to about 2 to 3 per cent. The permanent cures, if sufficient stomach is removed, will be well

over go per cent
So many questions are asked about postoperative anemia following resection, that
brief mention of it should be made. The great
majority of our cases have shown no anemia
following resection. This means simply that
anemia is not caused by resection, otherwise
it would be inequiable.

Some Lnglish surgeons have suggested that the anemia as a deficiency anemia due to rapid transit of food from the stomach to the colon with failure of absorption. With this I am inclined to agree. The one case in our series showing a 50 per cent hemoglobin was living on an inadequate milk diet. Ingested barium reached her colon in less than 3 hours. Put on a regular deit, with steak and French fired

potatoes, and good solid meals, she rapidly improved and has now a hemoglobin ap proaching 100 per cent. This is the reason I am opposed to the Polya type of operation where the jejinum is anastomosed to the whole length of stomach stump. Food, especially hequid food, goes right into the jejinum, and passes rapidly into the colon. Reports have shown that anemia after this type of operation is higher than following the Hofmeister Finisterer modification of Billioth II which is the operation here described.

CONCLUSIONS

In conclusion may it be again stated that if surgery is going to cure ulcer it must be ade quate surgery The surest way to Leep down acid (the agreed cause of chronicity) is to re move as much as possible of the acid secreting portion of the stomach Do a gastro enter ostoms and a certain percentage of marginal ulcers occurs Add an entero enterostomy (leading the alkaline neutralizing fluids of the duodenum away from the stoma) and you roore than double the incidence of marginal ulcer The jejunal mucosa can no longer re sist the corroding effect of the acid chyme Given a patient with hyperacidity over a hundred, cure is impossible until achlorhydna or at least a low acid is obtained

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CLINICAL SURGERY

FROM THE DEPARTMENT OF SURGERY, UNIVERSITY OF MICHIGAN

THE DEVELOPMENT OF THE TECHNIQUE OF THYROIDECTOMY

Presentation of Method Used in University Hospital

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HE development of surgery of the thyroid is one of the most fasciniting chapters in the history of surgery. The details of attempts to remove gotters in the years before the discovery of anesthesia, the development of hemostatic forceps, and the enunciation of the concept of antiseptic and aseptic surgery are almost too ghastly and hornble to believe. The operation was fraught with such danger that it was performed only in cases presenting severe suffocative symptoms. The mor

tality was unbelievably high

With the advent of anesthesia (1846), with Lister's memorable discovery of antisepsis (1867) shortly to be replaced by asepsis, and with the acceptance and use of the hemostatic forceps in European climes (about 1870), deliberate and elective surgical attack on diseases of the thyroid gland progressed rapidly. One needs but glance at the increasing number of goiter operations and the decreasing mortality during the third and early part of the fourth quarters of the nineteenth century to realize the tremendous impetus that these three epoch making discoveries gave to surgery Before 1850 about 70 gotter extirpations are known to have been performed with a mortality of 41 per cent (6) Kocher collected 146 cases in which operations were done, between 1850 and 1877, in this series the mortality had decreased to 21 2 per cent. In 1884 hocher's on n mortality in 43 cases had fallen to 6 o per cent In 1889 he reported 250 additional cases with 2 4 per cent mortality By 1895 his mortality in non malignant cases had fallen to a little over x per cent and in a new series of 560 non malignant cases reported in 1898 to o 18 per cent (7)

Gradually during this formative period the essentials of the technique of thyroidectomy as it is practiced today were evolved. Although the

admirible and courageous work of the great pioneers in thyroid surgery of France, Britain, Italy, and America (including such names as Desuilt, Dupuytren, Porta, Bottini, Watson, Nathan Smith, and Wilham Green) must not be disregarded, practically all of the major advances in thyroid surgery were propounded by surgeons of the Teutonic countries—Germany, Switzer land, and Austria

In pre antiseptic days the contributions of Hedenus, von Bruns, and Sick are outstanding. With the discovery of untisepsis the advance of surgery received great impetus. The teachings of Lister, disregarded by the majority of surgeons in England and America for nearly a quarter of a century, were quickly accepted by most of the better surgeons of Germany, Austria, and Switzerland, and with the ever-diminishing mortality from sepsis they were encouraged to advocate the operation in all cases of gotter instead of merely accepting for surgery those which presented symptoms of suffocution.

Billroth, early in his career in pre-antiseptic years, became discouraged with the operative treatment of thyroid disease and did not senously reconsider it until about 1877 (8) Thereafter his success was remarkable and his work greatly conductive to improvements in this field

Greatest credit, however, is due Theodor Kocher for increasing our knowledge of thyroid surgery Called to the chur of surgery at the University of Bernin 1872, at the 192 of 31 years, and spurred on by the success of his predecessor, Lucke, in the operative treatment of goiter, kocher rapidly collected a series of cases which, both in number and in decreasing mortality, soon far surpassed his contemporanes on the continent. Halsted (9) lists his contributions to the subject as follows (17) Discovery of the fact that total extirptation of

the thyroid gland is followed by body changes to which he gave the name thyreo- or strumi priva, (2) the studies with his life long friend Langhans of malignant tumors of the thyroid gland, (3) the perfecting of the operation of thyroidectomy, (4) the stimulus which he gave to the operative treatment of Graves' disease and to the study of the milder forms of hyperthyroidism. (5) the recognition of engrafted forms of Graves' disease (6) the demonstration of the value of the ligature of the arteries as a preliminary step to lobectoms in the highly toxic cases, and (7) the danger of the indiscriminate administration of iodine to patients with goiter. To these may be added several others (19) He did much to simplify the antiseptic method and develop the aseptic technique. His studies in the anatomy of the more or less constant vascular arrangement of the gland are noteworthy. One of the first to make critical follow up studies on his cases he stressed the necessity for this type of investigation and demonstrated its importance. He emphasized the value of rodine as a gorter preventive measure

Of particular interest are the technical ad vances made during this revolutionary period In 1874 Kocher (10), operating either through a longitudinal incision along the edge of the sternomastoid muscle or through the midbne, extir pated the gland from within its intrinsic capsule, accomplishing hemostasis posteriorly by dividing the pedicle like hinding strands into two to six

parts before tying. He usually dealt with the isthmus by ligation in toto. This was also essen tially the technique of Billroth at that time

In 1883 he advocated the 'Winkelschnitt incision (11) which combined a midline vertical incision from sternum to encoid cartilage with an oblique incision extending upward from the cncord to the anterior border of the sternomastoid The anterior and oblique jugular veins were lig ated at the outset, and the sternohyoid, sternothyroid and omohyoid muscles were divided in line with the oblique incision. He then bgated the superior pole vessels the lateral veins and the veins springing from the lower border of the lobe and isthmus, freeing the lobe completely, subsequent to which the inferior thyroid artery was isolated and ligated as close as possible to the caroud to prevent injury to the recurrent nerve Then working carefully along the posterior capsule he freed the whole lobe and severed the isthmus securing its vessels as they were divided Thus Kocher prevented to a large degree murs to the recurrent larvageal nerve so common an occurrence in Billroth 5 clinic The progress along technical lines in the o years is amazing

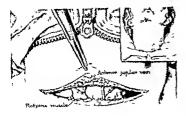
Because of the occurrence of 'cachesia strum priva" (named and described by Kocher in 1883) following total extirpation, Kocher strongly ad vocated lobectomy, reserving removal of both lobes for malignancy or the very unusual case in which removal of one lobe did not suffice to free the trachea He retained this opinion until his death in 1017 (12)

The symptoms of tetany, first described by Wolfler (13) in reporting on Billroth's clinic in 1879, occurred in evanescent form in total extir pations reported by Kocher (14) He considered it the acute form of the cachexia. The correct etiological factors in tetany and cachexia strum priva were not understood, of course until the observations of Gley in 1807 (10) and Murray in 1802 (15)

In 1808 Kocher (10) advocated three distinct tive features of the method then in use at Bern. The first of these was the transverse collar incision in the normal lines of skin cleavage. First de scribed by Boeckel in 1885 (19), it was popular ized by kocher and bears the latters name Second, the sternohyoid and sternothyroid muscles were not divided transversely but merely separated and freed sufficiently at their upper ends for exposure, thus incuring their nerve supply The third essential step was the luxation of the gland toward the medial side, accomplished after ligating the accessory veins, thus simplifying bgs tion of the main vessels

One other name deserves more than passing mention during this period. In 1886 Johann von Mikulicz (17) director of the surgical clinic of Krakau, in order to avoid the unpleasant compli cation of recurrent nerve palsy and to reduce the incidence of cachesia strumpriva in those pa tients in whom it became necessary to remove the second lobe, described the operation of "re-ec tion" This procedure differed from extirpation in that after ligating the superior pole vessels and veins to the lower pole of the lobe, and after dissecting the isthmus from the trachea antenority and laterally, the remaining attachment of the lobe lying in the tracheo-esophageal angle was divided into several parts crushed with hemostatic forceps, and ligated in the line of these 'clamp-made furrows The recurrent nerve and inferior thyroid artery were not seen

Mikulicz did not advocate this method because he considered it necessary to leave a portion of thyroid tissue as such. He did not consider the gland a vital organ and failed to relate the symp toms of cachexia strumipriva to a lack of thyroid secretion He feared recurrence of the goster and injury to the recurrent nerve and he had learned



وساؤست

Fig. 1 The exposure obtained by our method of draping is well shown. The insert demonstrates the level of the transverse incision which is carried through subculaneous fat and platy ama. The anterior jugular veins remain un molested.

through experience that it was often necessary to remove more than one lobe in order to relieve tracheal pressure and that cachevia strumpriva and tetany did not occur if a portion of one lobe remuned

To Mikuliez goes the credit not only for advocating and appreciating the value of resection in contradistinction to extrapation of the thyroid but also for discovering that masses of thyroid tissue might be crushed and ligated with im punity. His method embodies all of the mun essentials of thyroidectomy as practiced today

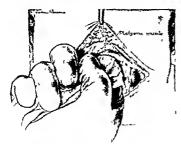


Fig. 3. The use of sharp dissection in ruising the upper flap of skin and platisma is avoided. This maneurer can quickly be accomplished by the use of Laure over the gloved finger, with a minimum of traums and bleething

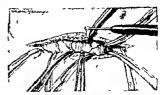


Fig. 2. The small blood vessels in subcutaneous tissue and platysma muscle are controlled by electrocoaculation in order to avoid in the superiscal layers the use of ratigat or other suture material so commonly the cause of serum collection beneath the flaps after operation.

No résumé of the development of thyroidec tomy is complete without mentioning the many contributions of Halsted, who did more to standardize technique and stimulate advance in surgery in the United States than any other individual He followed constantly at first hand the progress being made on the continent and incorporated the improvements of such men as Kocher, Billroth, and Mikulicz into a well blended whole, adding from an ingenious mind and from increasing experience many subtle changes. His experimental work with thiroid and more particularly parathyroid grafts is monumental. In 1879 he popularized the use of hemostatic forceps in this country and designed the more delicate form of this instrument which still bears his name. His originally designed retractors, ligature carriers. aneurism needles, scalpels, and dissectors, all introduced in 1888 to 1880, were innovations of real

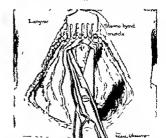


Fig. 4. The deep cervical fascia and sternohyoid muscles are separated in the midine to a point well above the thy roid notch and downward into the sternal notch. The skin flap retracted by assistant by means of Murphy retractor.

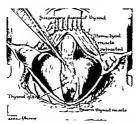


Fig. 7. The sternolly oid muscles have been separated from the underlying sternolly roid muscles to show the relationship of the latter situated somewhat more laterally and chinging closely to the gland. This maneuver is shown merely to charily anatomical landmarks and is of course not done at operation. The suspensory fascia of the thyroid is well demonstrated.

unportance In 1831 he introduced the rubber tissue drain. In 1884 he was among the first to use transfusion of defibrinated blood. In 1835 he became the pioneer in local infiltration anesthesia. In 1890 he introduced rubber gloses.

Halsted s technique of thyroidectomy based on sound anatomical and physiological principle, was a refinement which has been improved upon but little (18) Through a collar incision and by separating the prethyroid muscle in the midline,



Fig. 7. The circuityroid pace is being opened. When completed this maneuver allows mobilization of the uppole and a unids injury both to the recurrent nerve as it dips beneath the thyroid cartilage into the largus and to the hranches of the suptinor largingeal nerve.



Fig. 6. The stemoth out muscles and stemothyroid muscles are retracted together by means of Brewster retractive thus exposing the upper poles of the thyroid. The upper poles of the thyroid. The upper trached rangs are exposed beneath the sixthmus—a helpful lard mark as the operation progresses.

the thyroid was exposed. The superior pole was freed and divided between clamps placed a centi meter distal to the entrance of the pole vessels and applied from the lateral side As the gland was rolled medially the extrinsic capsule was di vided and brushed back following which a sensof fine artery clamps were applied on the posterolateral border of the gland defining the area to be resected. The lobe was then dropped hack the isthmus was eparated from the traches by a blunt dissector and divided after three or four vessels on its anterior surface had been clamped. Resec tion of the lobe was carried out from within out ward just distal to the encircling clamps These were secured by a whip stitch along the capsule and any residual oozing checked by transpixion stitches in the stump All lavers, including platys ma were closed separately with interrupted fine silk. Drainage was not used

The special features of this operation which decision into the Johns Hopkins Clinic were enimerated by Halsted as follows: (I) pre-criation of the superficial veins of the neck. (2) no mixele except the platisman is divided—not even the stemochyroid except in case of large or adhering golden-occasionally spit longitudinally. (3) deliver and division of the superior pole before the mander of the gland is dislocated, (3) re-ection in place of total lobectomy in order to protect the parathyroid glands and the recurrent larvings).



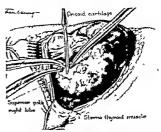
Fig 8 The superior pole has been mobilized both medially and laterally The superior thyroid vessels are divided between clamps only the vessels themselves being trasped. No thyroid tissue is left at the superior pole.

nerve and to preserve a slice of thyroid in case an operation might have to be performed on the opposite lobe, possibly by another surgeon, (6) ultraligation (w.cli beyond the origin of the parathyroid arteries) of the blood vessels, all of which are clamped before the lobe is resected, (7) ligation of the inferior thyroid artery is not practiced, (8) closure of the wound without drainage, made possible by the use of fine silk and the transfruon method for the absolute arrest of hemorrhage

In Halsted's clinic unilateral resection was practiced in the severe cases of evophthalmic gotter while bilateral resection was performed in colloid gotters, diffuse "conglomerate" adenoma tous goiters, and in the milder forms of Graves' disease. Large discrete adenomas were enucleated in a unique manner

American surgeons, following the lead of Halsted, rapidly improved their methods until the procedure of thi roidectomy became more or less standardized. In its many minutuse the operation varies considerably in different hands, but the essentials of the technique remain the same. During recent years many surgeons have detailed modifications in procedure which from their experence have proved most satisfactory, and it is interesting to note the many variations in approach and minute technique which are being practiced in this field today.

The complications of recurrent nerve paralysis and postoperative fetant have remained of great importance, although the incidence of both has been greatly reduced with improvement in method. Permanent parathyroid tetany has become a rantly. The incidence of recurrent nerve injury, however, is most difficult to ascertain.



I ig 9 Lateral view (from position of operator) of same maneuver as demonstrated in Figure 8. It should be noted that the superior vessels are clamped on the anterior surface of the pole.

from the literature and would probably prove to be surprisingly high were all cases subjected to examination of the lary in before and after operation. The more recent anatomical contributions of Fowler and Hanson, Nordland, and Roeder (24), clarifying the relationships of the pre-tracheal fascia to the thyroid and recurrent nerves as well as the variations in relationship of this nerve normally and in cases with marked enlargement of the thyroid, particularly substernal adenomias, should prove of value in reducing the incidence of this complication. The danger of tension on the nerve by rough and excessive rotation of the lobe has been emphysized by Crile.

In recent years the superior lary ngeal nerve has received considerable attention and the effects of its section or injury have been noted both experimentally and clinically. Fowler emphysized

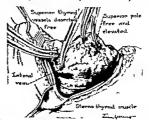
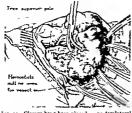


Fig. to The superior thyroid vessels have been divided thus allowing the pole to be dislocated anteriorly. The lateral ven is divided as this is being accomplished so that the superior pole is completely mobilized.



500

Fig. 11 Clamps have been placed on posterolateral as pect of lobe to designate line of resection. In substernal gotters after upper pole is freed enough mobility of lobe is obtained to permit delivery of substernal portion into wound without difficulty before these clamps are applied

the close proximity of this nerve to the superior thyroid vessels and suggested that injury to it might result in minor vocal changes Berlin and Laher (1) pointed out the fact that in practically all instances the interartenoid muscle is innervated by the internal branch of the superior larvingeal nerve. This finding has been corroborated by the dissections of Nordland Roeder (24) pointed out the possible effects of injury of the branches of the superior larvingeal nerve and advocated a method of delivering the superior pole to prevent

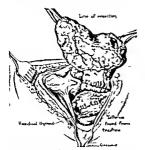
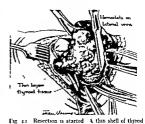


Fig. 13 Resection of right lobe has been completed and the 1sthmus has been dissected free from the tracken. The amount of residual thyroid is demonstrated



ti sue and posterior thyroid capsule is left in order to protect the paratheroid muscles and the recurrent perves ote that the line of resection begins below the superior pole

such injuries. In a recent paper Eades re empha sized the importance of guarding against damage to this nerve and presented a variation in techni cal approach to the superior pole averting this complication Johnson has demonstrated on cats the effect of such injury by the production of mucus plugs in the trachea and larv nx after sever ance of this nerve and the stimulation of either the peripheral or central ends of the divided nerie

UNIVERSITY HOSPITAL TECHNIQUE

For many years the technique of thyroidectomy as practiced in the University Hospital has been a standardized procedure Because of the fact that we have been unable to find in the literature a

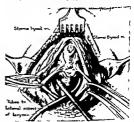


Fig 14 Bilateral resection has been completed Small rubber tube drains are placed in dead space left at the lateral aspect of the larynx

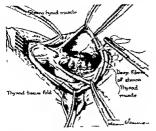


Fig. 15. The deep fibers of the sternothyroid muscles are being approximated. This step is of importance since it allows more complete obliteration of the dead space which remains following resection.

description of the operation as it is performed at the University Hospital, and because it combines many technical features which have proved to be particularly advantageous, we believe it worth while to present this technique in considerable detail

The apper sheet used for draping (Fig. 1) has been previously described in detail (a). The advantages of this device are simplicity of application, more thorough asepsis in the operative field since it fits snugly around the neck and covers the anesthetist without the inconvenience of a metal hoop or other appliance over the patient's

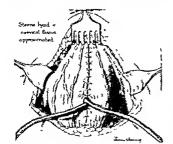


Fig. 17. Sternohy oud muscles and deep cervical facts approximated with interrupted stitches. Contrary to the disstration the knots are burned benerith this layer to avoid excessive suture material beneath the skin playsman slap. Only five to six sutures are necessary for this procedure.



Fig. 16 The sternothyroid muscles are approximated in the midine to provide more adequate covering for the trachea as well as to obliterate dead space. Drains cross in the midline

head, more adequate space for operator and assistants

The Kocher incision is made approximately one finger's breadth above the upper borders of the inner ends of the clavicle (Fig. 1) and is curved very slightly with the convenity downward Oftentimes it is practically straight when the head is markedly extended, becoming slightly convex when the head is held in the normal attitude The platysma is divided transversely (Fig. Superficial blood vessels in subcutaneous fat and platysma are coagulated by means of the Bovie unit (Fig 2) It is our distinct feeling that the collection of serum beneath the flap is most often the result of catgut sutures placed in this region and that this complication is minimized by the use of electrocongulation. It is also a time saving device. The upper flap of skin and pla tisma is readily dissected upward from the deep fascia to just above the thyroid notch with a mini mum of bleeding by means of a piece of gauze



tan record

Fig. 18 Towel clips grasp the angles of the incision for traction to facilitate accurate application of skin clips. The drains are brought out at the angles.

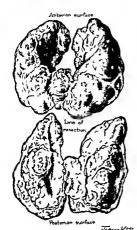


Fig. 10 Anterior and posterior aspects of the resected aland. The line of resection and the amount of thy road tissue removed are demonstrated.

over the gloved finger (Fig 3) It is then retracted by mean of the Murphy rake held by an assist ant (Fig 4) The lower flap and the anterior jugular veins are not molested minimizing the danger of air embolus

The deep cervical fascia is divided in the mid line (Fig. 4) to a point slightly above the thyroid notch thus exposing the isthmus of the thyroid This permits retraction of the sternohyoid muscles and exposes the lobes of the thyroid covered by sternohyorid muscles which he somewhat more laterally (Fig. 5). These muscles are now carefully separated from the thiroid lobes and etractive the attention with the sternohyoids and deep cervical fascia by means of a Brewster retractor, the gentle concavit of which permits depression of its handle posteriorly to allow casy access to the lobe. The retractor is used only on one side and after lobectomy is transferred to the opposite side two retractors having been shown

in the illustration for the sake of clarity. Even in many large goiters the exposure afforded by this means proces sufficient. However, we do not heisitate to divide the muscles transversely when occasion demands. Transverse division of the deep cervical fascia and reflection upward with platjsman as advocated by Reeder (23) compels the unnecessary, ligation of the anterior jugular weins and adds little to the exposure.

with soft muscles thus retracted the suspen sory fasca of the thyroid (Fig. 5) is divided above the isthmus and the upper trached ings exposed as a landmark for future reference (Fig. 6). At this juncture should a pyramidal lobe be found it is freed completely. After exposure of the trached rings above the isthmus it is easy by means of blund dissection to define the encothyroid space lying between the medial aspect of the upper pole and the thin fasca covering the croothyroid muscle (Fig. 7). This space can be opened with out fear of injury to the superior thyroid vessels and permits complete separation of the superior pole from the lary are thus avoiding injury to the branches of the superior laryinged inerve as they

enter the laryny and cricothyroid muscle The superior thyroid vessels, lying on the ante rior surface of the pole, are readily divided between clamps (Figs 8 and 9) permitting complete de livery of this structure by dislocating it from its bed and pulling it antenorly by means of tenacula or ordinary towel clips (Fig. 10) As this is being accomplished the lateral vein is divided as well This dissection is carried out just beneath the immediate fascial covering and, if done carefully, eliminates the possibility of injury to the branches of the superior lary ngeal nerve. Only the superior thyroid vessels are included in the hemostats, the pole being delivered in its entirety. The clamps on the superior thyroid vessels and lateral vein are not tied until complete resection of the lobe has been accomplished although again this has been depicted in order to simplify the illustra tions

This method of delivery of the pole is somewhat similar to that recently described by Eades However, there is no other reference in the literature to a Corresponding procedure

After the upper pole has been released in the remainder of the lobe into the wound even though it may be deep beneath the stermum. If the lower pole cannot be delivered at this point by gentle traction the resection of the gland is carried from above and laterally until a point is rethel where the lower pole can be delivered. If it be borne in mind that substernal prolongations of the lobe do not have substernal anatomical attachments, it can be seen that after freeing the normal cervical attachments the lower pole should be easily delivered. We have yet to encounter a lohe with certical attachments that could not be removed in this manner Hemostats are now placed on the lateral surface of the lobe to outline the area for resection (Fig 11), and a thin layer of thyroid tissue is left with the posterior thyroid capsule to protect the parathyroid bodies and the recurrent nerve (Fig 12) This dissection is curried out from the lateral side and is guided as the trachea is approached by the view of the upper tracheal rings exposed earlier in the dissection The 1sthmus in its entirety is dissected carefully from the tracher along the areolar plane lying between these structures (Fig 13) We believe that this step results in less chance for adhesion of the trachea to the prethy rold muscles and is less productive of tracheitis than though thy roid tis sue is left on the trachea

The amount of thyroid tissue which should be left after thyroidectomy is difficult to describe It is our practice to leave only a small fraction of the total gland, the exact amount varying somewhat with the type of disease. This can best be demonstrated by referring to Figures 13 and 19

Hemostasis is accomplished by means of fine catgut ligatures and sutures, the clamps on the superior thyroid vessels ligated last to provide greatest exposure The remaining thyroid tissue is not folded over on itself or sutured over the trachea because of danger of producing torsion of the recurrent nerves. This possibility has been emphasized by Noehren The use of fine silk in the thyroid bed has been largely abandoned. Its use has proved of no real advantage when weighed against the fact that it is quite definitely more time consuming

In reviewing the literature we have found wide differences of opinion regarding drainage following resection Since it is impossible to obliterate completely the dead space lateral to the trachea and lary ny following extirpation we continue to drain practically all of our cases Drainage is accomplished by means of small soft rubber tubes placed on each side of the larynx, crossing in the midline as they emerge from the prethyroid muscles, and brought out at the angles of the skin incision (Figs 14, 16, 17, and 18) The drains are removed in 6 to 12 hours. We avoid drainage through the midline because approximation of the skin is apt to be less exact at the site of dramage with a resultant irregular scar. It is of particular importance to avoid midline drains in women since in the midline of the neck the subcutaneous fat pad is approximately twice as thick as it is lateral to this point Accurate restoration of this fat pad is essential to a sightly scar

The prethyroid muscles are sutured in two layers over the tracher. In suturing the sternothyroid muscle the deep fibers of the muscle are approximated without tension (Figs 15 and 16), in order to close more completely the dead space left by removal of the thy roid lobes This maneuver is particularly advantageous in cases of sub sternal gotter as its use will obliterate the cavity in the upper thoracic strait that usually fills with serum and blood This muscle, drawn snugly over the thyroid residue, acts as a hemostatic agent, provides added protection for the trachea, and prevents the formation of adhesions between the trachea and superficial layers, which may result in the annoying scar which moves with deglutition. In suturing the sternohyoid and deep cervical fascia we bury the knots in an attempt to prevent serum accumulations beneath the skin flap (Fig. 17) Suture of the platy sma separately is not practiced since it merely necessitates the placing of more foreign material in the wound The skin is closed with either the Herff (Fig. 18) or Michel clips, one half of which are removed on the first and the remainder on the second postoperative day

SUMMARY

The development of the technique of thyroidectomy has been reviewed briefly with particular reference to the advances made by Kocher, Mikulicz, and Halsted The importance of the superior lary ngent nerves in thy roidectomy has been emphasized The technique of thyroidectomy as practiced at the University Hospital has been given in detail and illustrated, with particular emphasis on the method of attack on the superior pole

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CARCINOMA OF COLON

Treatment Depending on Location of Lesion

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HE symptoms of carcinoma of the colon in the early stages are rather clusive There are, as a matter of fact, no specific signs that would lead one to suspect the existence of a grave lesion and thus make an early dragnosis of this disease possible. There should be no difficulty, however, in making a correct diagnosis when the late symptoms-blood, mucus, and the discharge of pus in the stools occur Occasionally pain, tenderness, and rigidity may furnish the clue as to the nature of the lesion, but these symptoms are too often masked by the seemingly fine state of health of the individual, giving no evidence of any serious condition The x-ray here could be of great help and should always be considered to clear the situation

Histories, in a critical review of 158 cases, showed that progressive constituation, diarrhea, followed by constituation, must be looked upon with suspicion. A change in bowel habit, backne, and especially pain are suggestive of serious trouble. Late in the disease, in addition to these symptoms, there will occur a myrked anemia tinged with cachevia, and generalized weakness.

Pettinari points out that obstinute diarrhea is the chief symptom of rectal carcinoma. H. M. Weber states that any changes in intestinal habit are indications for a thorough x-ray investigation of the intestinal tract.

SYMPTOMS DEPFNDENT ON LOCATION OF LESION

Symptoms depend both on the character and the location of the lesion in the colon. When the lesion occurs in the region of the cecum, 55 mptoms of appendicutis may suddenly appear due to the inflammation surrounding the cancer. A mass is felt, often ascribed to the presence of an appendiceal abscess. When the abdomen is opened, the true nature of the cause that gave rise to the symptoms is revealed. The same may be said of circinoma in the ascending and hepatic flexures of the colon. When the tumor occurs in the descending colon where the constrictive type of carcinoma is generally found, obstructive symp-Read before the Creater Boston Vicinal Secret. March 9

From the surgical services the Jewish and Mount Sinai ho pitals I biladelphia I a

toms and increasing constipation should lead to the dragnosis. In the rectum and the lower sig moid where the ulcerative type of lesion is encountered, associated pain is more frequent than in other locations, save the constrictive type Vague symptoms may last for years until the sudden onset of definite signs reveals the catas trophe It is my firm belief that in the constrictive type, symptoms may begin at least 5 years before any outward signs are apparent, although Crafoord and others have observed that 7 to 0 months is the average lapse between initial symptoms and the diagnosis A history of increasing constipation and symptoms of chronic intestinal obstruction then, must always be viewed with suspicion as the resultant of some grave lesion of the intestinal tract. For example, a patient recently admitted for operation had signs of chronic intestinal obstruction for 18 months (Fig 1) The lesion was in the splenic flexure, apposing the diaphragm. The radiologist reported no obstructive lesion present. At opera tion we found an adherent tumor in the region of the left lumbocostal arch of the diaphragm Colostomy was performed, but the patient's tissues were so devitalized as to prevent agglutination of the gut to the abdominal wound He died before a second operation could be performed In the ulcerative forms of the disease symptoms appear from 1 to 3 years before late symptoms arise

FREQUENCY AND LOCATION OF LESION

It is a well known fact that there is an appalling increase in the number of cases of cancer of the colon. Dr. Dixon, of the Mayo Clinic, states that "in the year 1935 the largest number of surgical conditions of the intestine in the history of the chine was handled." Therefore, when a patient presents himself with the symptoms already mentioned, one must necessarily bear in mind this alarming increase. A report from the Metropolitan Life Insurance Company states that cancer in general is increasing at the rate of 15 per cent per year. During the month of January, I operated on 8 patients with cancinoma of the stomach appears correspondingly less in the picture.



Fig 1 Csrcinoma of the splenic flexure Undiagnosed until operation was performed Treated medically 18 months for chronic intestinal obstruction

In the Lucien Moss Home of the Jewish Hospital where incurables are admitted many patients have been treated in whom the true diagnosis of cancer was never made. Of the 130 patients admitted to the active services of the lewish Hospital we were compelled to discharge 50 as inoperable. The latter do not appear in any graphs. Autopsy of medical cases disclosed numerous cases of cancer which had remained unsuspected or undiagnosed

According to a personal communication from Dr Harry Bacon of the Philadelphia General Hospital, of 510 patients admitted, 49 1 per cent were inoperable as a result of fixation of the growth, involvement of adjacent structures pal pable liver metastasis, v ray examination, or exploratory laparotomy Naturally more patients with inoperable conditions would be admitted to this type of hospital as it receives mostly the poor and underprivileged common to county hospitals

In the Mount Sinai Hospital 78 patients were admitted in the past 10 years. These also illus

TABLE I -- ANATOMICAL DISTRIBUTION IN 1,8 CASES OF CARCINOMA OF THE COLOR

CASES OF CARCINOSIA OF THE COLOA	
	Cases
Cecum	14
Ascending colon	- 1
Hepatic flexure	
Transverse colon	,
Splene flexure	6
Descending colon	7
Sigmoid	٠,٠
Rectosigmoid	16
Rectum	fio
Anorectal junction	- 1
Ascending colon and reclosigmoid junction (multiple) i

TABLE II - AGE ANI	SFX INCIDENCE
Ages to Years	Cares
20 to 30	3
30 to 40	13
40 to 50	35
50 to 60	33
60 to 70	31 18
, o to 80	18
Ses	
Male	82
Female	

trate the all too frequent failure to diagnose tumors of the colon It has been my experience that lesions in the colon are fairly equally well distributed, with the great majority in the rectosigmoid and rectal region (Table I)

AGE INCIDENCE AND SEX

In carcinoma of the colon, as in cancer in other parts of the body, the younger the individual affected the more malignant is the lesion (Table Ross states that cancer of the rectum is not strictly a disease of old age. In 2 to 4 per cent of cases it occurs before the thirteenth year Larson and Nordland sage range was from 14 to 84 years of age The youngest patient I ever operated upon was a girl of 23 Cancer affected the trans verse colon She died from general carcinomato is about 8 months following the primary operation A robust man of 29 years, with carcinoma of the rectum was apparently well for 8 months follow ing a two stage operation when he died of metastasts to other organs (Fig 2) The oldest patient was 72 years of age He had a large mass in the region of the sigmoid (Fig 3) After a modified Mickulicz operation he left the hospital in about 6 weeks, with a pin point opening of the wound

Generally speaking males are more prone to cancer of the colon and rectum than females In our combined group of 158 cases there were 81 males and 77 females (Table II)



Fig. 2. Carcinoma of rectum in a robust man of 19 years Died from metastasis 8 months following operation

I S Railford in a study of \$11\$ cases of cancer of the colon and rectum found that male patients outnumbered female patients two to one, while I arson and Nordland in a review of 210 cases found an equal frequency in males and females. In Hevdemann's group of 346, 63 per cent vere males and 47 per cent were females.

METHODS OF DIAGNOSIS

Any individual past 35 years, with indefinite abdominal symptoms present, should have a digital and sigmoidoscopic examination of the rectum and a barum enema for determination by viray whether a lesion is present.

A digital examination is advised because most cases of carcinoma reported have been situated in the rectum from 4 to 6 inches above the anus. The patient should be placed in various positions for the examination, namely, in the dorsal, the lateral, flat on the abdomen, and the knee chest position. From experience it has been shown that a lesion which cannot be felt in one position may nevertheless be found in another. The significant of the signi



I so 3 Carcinoma of sigmoid in a man 7° years of age Patient enjoying very good health

mordoscope is of great help for lesions situated above the reach of the examining finger. This examination is also important in detecting polyps in those patients in whom these tumors precede carcinoma However, I have not observed great frequency of polyps as precursors of cancer of the colon. Most of my patients had advanced types with ulceration of the mucous membrane and destruction of the predisposing polyp Nevertheless most surgeons believe that adenomatous polyps predispose to cancer of the colon Felsen and Wells collected statistics from Doering, Hullsiek, Yeomans, Susman, and Westlus The incidence of polyposis ranged from 34 to 100 per cent It is not wise, if nothing is found by a digital examination, to depend on that fact alone to make a negative diagnosis, especially with a continuation of symptoms, one negative report from the radiologist should not preclude the thought of a possible cancer. An examination at various intervals is necessary to determine the cause of symptoms, for the lesion may not have progressed sufficiently to register the barium enema



Fig. 4. A case of pseudomytoma persiones of the cecum Sometimes physical signs resemble carcinoma

Symptoms in the first stages of carcinoma of the colon may simulate various conditions found in the abdomen thus rendering the early diagnosis an exceedingly difficult one \ \ \ et early diagnosis is most important in cancer of the colon as in this way only can the greatest number receive the greatest good at the hands of the surgeon. In the later stages when the tumor is felt, and the diag nosis is easily made, it is too late for the surgeon to be helpful Curiously enough even at this stage of the disease there are many failures in its recognition A tumor or tumefaction may be present without being palpable through the ab dominal wall, naturally an unfortunate situation, since even at this time the patient may feel and look well. When a turnor is felt in the various divisions of the colon, a differential diagnosis between similar lesions of other organs in the same neighborhood must be made. Most of the mis takes in such diagnoses occur when a mass is felt in the right iliac fossa. To illustrate, a patient wasadmitted who presented, in the films, a typical defect characteristic of cancer of the cecum. The microscopic report showed this to be pseudomy toma peritonel associated with a malignant carcinoid tumor of the appendix (Figs 4, 5 and 6) The patient is now in perfect health, having gained 40 pounds in weight since operation Again a lesion in the splenic flexure may be mis taken for a tumor of the spleen or kidney How ever, with blood studies and a consideration of the general outline and contour of the spleen one should be able to differentiate between these two conditions Recently a patient came under observation in whom we could not demonstrate by means of physical examination the exact location of the lesion. At operation we found a retroperitoneal sarcoma Lesions in the descending colon are usually of a small constrictive type and



Fig 5 Pseudomyxoma peritonei as seen under the microscope

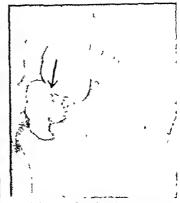


Fig. 6 For comparison a true case of carcinoma of the



Fig ? Carcinoma of the rectosigmoid usually a tumor of considerable size

give rise to symptoms of chronic intestinal obstruction It is, therefore, very difficult to palpate a tumor in this region. Such a type of tumor may continue for years without giving any signs of cachexia Cancer of the rectosigmoid (Fig. 7) usually involves a tumor of considerable size and takes some time to develop. On account of the continual traumatism the mucous membrane is generally ulcerated Pemperatoneal inflammation of the gut is often present. Diverticultis usually occurs on the left side and is often mistaken for carcinoma found in the left half of the colon Operation reveals the true nature of the disease which requires usually incision and drainage Ulceration is a very common occurrence in carcinoma of the rectum during the late stages, giving rise to mucus, blood, and foul discharge. This, so often the first definite sign, must constitute a warning to the patient and physician alike, as to the nature of his condition. In a few cases, carcinoma of the ulcerative type occurs an inch or 2 above the anus and may involve the anus itself Such cases are usually brought to our attention early because of the irritation and discomfort suffered by the patient. How often in pa tients with carcinoma of the gastro intestinal tract a diagnosis of pernicious anemia is made! I can cite many examples of this flagrant mistake One will



I ig 8 Carcinoma of ascending colon Patient 58 years old treated for permissions anemia. Admitted to hospital with hemoglobin of 30



Fig 9 A case of multiple carcinoms of the colon affect ing ascending colon and rectosigmoid function



Fig. 10. Cross specimen closed. Carcinoma of ascending colon and cecum.

suffice A patient 58 vears old had been treated by a protologust for one year for bleeding from the bowel (Fig. 8). Upon admission to the hospital, his hemoglobin was 30 After numerous transfusions a resection in two stages was per formed. The patient lived 2 years during which time he was able to follow his former occupation Karsner Clark and Rankin point out the fact that anemia is more severe in carcinoma of the right half of the colon than in cancer of the left half.

SIMULTANFOUS MULTILLE LESIONS

The presence of simultaneous multiple car cinomas of the colon is not a common condition. The symptoms are the same as those found in a single lesion. The diagnosis is usually made with the x ray. I have had one patient in whom there was found cancer of the ascending colon and of the rectosigmoid junction (Fig. 9). A complete colection yin stages was performed

Simultaneous cancer of the stomach and ascending colon was found in another patient. The disease in the stomach for which a resection was performed was far advanced. The lesson in the colon may have been a primary or secondary one



Fig. 14 Same specimen as shown in Figure 10-opened

This could never be proved. The patient did well after the operation. However, soon after deep v ray therapy was begun for the colon cancer, the pa tient reacted badly and died about 5 months after the original operation Warren and Gates col lected 1,872 cases of multiple carcinoma of the colon In one group the incidence was I per cent in another 6 per cent of the total number of cases of multiple carcinoma in all parts of the body A J Cokkins reports 4 original cases of multiple car cinomas of the colon He observes that one should always look for multiple growths in all operations for cancer of the intestine Bargen and Rankin have seen 16 cases In reporting 2 cases of multi ple cancer of the colon, Thompson states that before multiple carcinomas can be classified as separate and distinct lesions, Billroth's postulates must be considered, namely, that (1) the 2 growths must show distinct histological differ ences which must be so pronounced as to exclude the possibility that they are of the same origin but in different stages of development (2) that each growth must spring from its parent epi thehum (3) that each growth must be held responsible for its own group of metastatic growth>

ILEITIS AND CARCINOMA OF THE COLON

Hetts has recently become according to some, a rather common affection. It must be considered, therefore, in a differential diagnosts from cir cinoma whenever ileius attacks the ileum and a portion of the cecum. \[\triangle \text{catmathran} \] will here be of great assistance. Physical examinations will not be promised in large tumefaction in the common suil not help much if a large tumefaction is the common suil not help much if a large tumefaction is the common suil not be such as a suit of the common suil not be suited as a suit of the common suited in the



 $\mathbf{Fi}_{\mathbf{s}_{\mathbf{s}}}$ 12. Carcinoma of the transverse colon in an obese Italian woman

present Some similarity to cancer exists in the samptoms, such as blood and mucus in the stools, with intermittent diarrhea. There is usually, however, a leucocytosis in ileitis which is absent in carcinoma of the colon except in cases in which perforation and inflammatory reaction have occurred around the cancer. Strange to relate, in an active surgical experience of nearly 30 years, I have never operated upon a patient with lettis.

OBESITY AND CANCER OF THE COLON

Formerly all cuncer cases were associated with emaciation. That cancer of the colon occurs in well nourished individuals, often in the prime of life, when least suspected, has been frequently observed Obesity is no guarantee against carrinoma at any time, in any prict of the body. This is especially true of carcinoma of the gastrointestural tract which claims victims frequently weighing around 200 pounds. Within the past 2 months, I have had the experience of operating upon 3 such patients, i man and 2 women, who apparently were in the pink of health. They were well nourished, had ruddy cheeks, and they oungest was a man of 40, whose case remained undag nosed for a year because his physicians, with the



Lig 13 Specimen illustrating v ray of Figure 12

exception of the last consultant, did not believe that he could harbor a milgnant growth (Figs 10, 11) A cancer of the cecum and ascending colon was found. Of the women, one, an obese Italian, on whom I had operated 12 years before for acute suppurative appendicitis, hid a cancer located in the transverse colon (Figs 12, 13, 14). The third patient gave a history of a hemorrhage 8 years ago. This did not give her much concern The bleeding recurred recently, however, when she sought medical advice. Year examination



<u>របស់សម្រាស់ ប្រជាជាប្រជាជាប្រជា</u>

Fig 14 Closeup of specimen shown in Figure 13



Fig. 13. Patient had numerous hemorrhages. Specimen shows marked thickening of wall of eccum.

showed a lesion in the cecum (Figs. 15, 16) Judging from external appearances no one would have considered a malignant lesion as a probability. A partial colections was performed in all these patients with good recovery.

IRRADIATION OF CANCER OF THE COLON

In the consideration of pre operative and post operative treatment of cancer of the colon, it is fitting that the subject of irradiation receive due consideration. In my experience irradiation by means of the v ray or radium has never influenced the progress of the disease so far as the beneficial results of these agents are concerned although Binkley believes that tumors of the lower part of the rectal and anal wall respond well to x ray and radium Railford in an excellent dissertation on carcinoma of the colon concludes that irradia tion may relieve symptoms and prolong life in the hopeless case It has been my thought for many years that the powerful dosage of v ray upon gastro intestinal carcinoma has done more harm than good by metastasis to other organs In addition to its questionable effects, deep x ray therapy has a devitalizing effect upon the blood It necessitates many transfusions while this form of treatment is being used. After operation if one is not absolutely sure of the entire removal of the growth and the involved glands deep v rav therapy should be used for a limited time only A thorough operation with removal of the entire lesion leaves little need for deep x ray therapy Operation then holds out the best prognosis for the patient suffering from cancer of the colon

PRE OPERATIVE TREATMENT

Pre operative and postoperative treatment of patients suffering from carcinoma of the colon has changed very radically in the past few years



Fig. 16 Same specimen as shown in Figure 12-opened and showing much thickened wall of cecum.

This fact has contributed much to our le ende mortality, and a generalli improved convaler-cence of these patients. Before operation it is essential that the intestinal tract should be thoroughly cleansed with castor oil followed to one or two dually colonic irrigations, and the in fusion of 500 to 1000 cubic centimeters of 10 per cent glucose by vencely sis. The diet for at lea t 2 or 3, days should be sweetened higuids no milk. Empirically I digitalize all of these patients. It has not done any harm, while it may do good if more than a one stage operation is required the patient must go through exactly this same routine.

IMMUNIZATION OF THE PATIENT

I still have an open mind on the use of per inngens vaccine given intraperstoneally or intra muscularit or the vaccine of killed streptococustaphylococcus, and colon bacillus, admini terd intraperstoneally at least 48 hours before open tion. It may be beneficial also after operation, and be repeated before and after each stage. The procedure has given rise to a difference of opinion concerning the efficacy of vaccine before and after operations on the colon For many years I did not use them. My recent resort to them has given no appreciable difference in the number of infections In conversation with Dr L W Smith, professor of pathology, Temple University, it was set forth that in order to immunize these nationts the vaccine must be given at least to days before operation. Accordingly much of our treatment by immunization is superfluous There is still a wide difference of opinion concerning the efficacy of the use of vaccines in the prevention of infection Those at the Mayo Chinic are certain that vaccines are efficient, while Cattell never uses them Rankin now believes that they do no good Wilkie attempts immunization 8 and 3 days before operation To induce leucocy tosis he injects, the night before operation, 5 cubic centimeters of 5 per cent solution of sodium nuclemate

After operation we use continuous hypodermoclysis, and if necessing as many blood transfusions as are indicated are given before and after operation. In those cases, for instance, in which a mistaken diagnosis of anemia has been made, when the bemoglobin is around 30, it is obvious that several transfusions must be given before operation. After operation there is no question that blood transfusions act as a great tonic to these patients.

ANESTHESIA

Spinal anesthesia is the best anesthetic, in my experience, in the performance of operations on the colon If the operation is performed in different stages, no matter how many, spinal anesthesia is always my choice Here, as in other abdominal conditions, especially those in the upper abdomen, spinal anesthesia has saved many lives Operations on the colon can be done in an almost aseptic manner due to the perfect relaxation one obtains by this form of block anesthesia. There is, then, less danger of spreading infection because of the surgeon's perfect control of the in testinal tract Furthermore, this form of anesthesia is as safe as any other we have used. In somewhat over 300 cases I have never bad a death following the use of neocaine

OPERATION

Much has been learned in the past few years concerning the various types of operation that should be performed, depending on the location of the lesson With the added experience guined from a great increase in the number of cases of

carcinoma of the colon, I have become an advocate of the 2 stage operation in most cases of carcinoma of the colon. I believe that more lives will be saved by the 2 stage operation than by the operation in one stage. This applies especially to those patients in whom considerable inflammation has occurred around the tumor. The per formance of a preliminary colostomy preceding the operation for removal of the growth by allowing the inflammation around the tumor to subside demonstrates the soundness of this advice. A more perfect operation with less danger of infection is thus made possible.

There is no question that whenever and wherever the Mickelicz operation can be performed, it is unquestionably the safest to do In this modification the tumor is excised between clamps at the first operation For carcinoma in the region of the cecum, two methods can be employed A portion of the ileum, cecum, and ascending colon may be excised and presented in the wound as a double barrelled ileostomy and colostomy other method and one which is preferable because it chiminates a colostomy is, first, to perform an ileotransversecolostomy with closure of the abdomen, the ileum and the colon including the growth being removed later The ends of the ileum and colon are closed. This operation may also be performed in one stage, with an added Pezzer ileostomy as a protection against dis tention. The ideal operation in the constrictive type of carcinoma of the colon is a preliminary colostomy with resection of the tumor and an end-to-end anastomosis These constrictive types, as stated before, are usually found in the ascending and descending colons. A tumor at the rectosigmoid junction or rectum is probably best treated by the Lahey or Rankin type of operation, the two stage operation that has been very helpful m the solution of this problem Occasionally when cancer attacks the rectosigmoid junction and is operated upon by a modified Mickulicz operation, the tumor with the colon must first be mobilized Carcinoma near the anus can be excised The rectum is mobilized and a new anus is made by suturing the rectum to the skin, without a preliminary colostomy Stricture of the new anus is prevented by the use of rectal bougies Electrocoagulation of the ulcer can also be employed The results following this procedure have justified the method

INFECTION

Infection by the colon bacillus seems to be the bete noire of operations upon the large box el Infection ranges from a slight stitch abscess to a massive peritonius. The aphorism of the late

John B Deaver is applicable to this type of in testinal surgery "Cut well, sew well, get well' Let even after adherence to all these principles infection occurs all too frequently It always happens after the final operation, namely the closure of the colostomy and the second stage of any of the many types of operation employed With all the refinements of anastomosis by oc clusion, or the so called asentic type of anastomosis infection of a mild to a serious degree complicates the course of every patient operated upon

Late infection in the region of the loin space has occurred in a fair percentage of cases. As a result of this I now, at the time of operation, make an incl.ion for drainage lateral to the wound and drain with tube or gauze and rubber at this point. The pelvis is also drained, following the second stage operations on the sigmoid and rectum

MORTALITY The mortality following operations on the colon in former years was appalling. It ranged between to and to per cent. On account of our selective type of operation and better technique this has been greatly reduced. At present the mortality is about to per cent F Mandl, in review of 135 operations states that after radical sacral methods they have had a mortality a little less than 10 per cent. Heydemann states 23 7 per cent. died after the radical operation. The greatest danger naturally arises from peritonitis because of the ever present colon bacillus in the large intestine. It is impossible to sterilize the colon In contradistinction the small intestine can be operated upon freely and one might say carele-sly without a semblance of any infection following operation. From both hospitals, we can record a number of 5 and 7 year cures, but most of the patients on whom we operated have had recorrences within 3 years

CONCLUSIONS

- In all symptoms referable to the gastrointestinal tract it behooves us then to be suspictous of carcinoma of the colon Early diagnosis is of paramount importance,
- 2 Mr-taking carcinoma of the colon for per micious anemia is a tragic and unpardonable mistake
- 3 Pre-operative preparation and po toperative care are important factors in reducing the immediate mortality
- 4 Operations for carcinoma of the colon are selective depending upon the location of the lesion

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ACCIDENTS IN RENAL SURGERY

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CCIDENTS in renal surgery, whether slight or extensive, avoidable or unavoidable, always give the surgeon A great concern In reviewing the literature one is impressed with the scarcity of reports Undoubtedly there are many such accidents, but reports of them fail to reach the literature

An analysis has been made of all the surgical renal cases, exclusive of those affecting the ureter, in which operation has been done at the Sinai Hospital during the past 15 years. It has been found that during this period, on the urological service, 345 operations have been performed on the kidney, and that there were 43 accidents, 12 5 per cent, in 40 patients

The accidents are listed in Table I

The types of operation being performed when accident occurred are given in Table II

For the purpose of discussion the accidents are

divided into the four following groups

I Accidents in the approach to the kidney II Accidents to the blood vessels and kidney III Accidents to the closely approximated or distant structures during the operation

IV Accidents immediately after operation

In group I the following accidents may occur (x) the thohypogastric or first lumbar nerve may be severed, (2) the pentoneal cavity may be opened, (3) there may be hemorrhage, (4) a rib may be fractured. (5) there may ensue temporary paralysis of an arm

While some few accidents have occurred and can occur very readily in the approach to the kidney, they do not comprise the largest or the most serious group. We have encountered in accidents in this group which were caused principally by having insufficient operating space, poor exposure, improper position of the patient, or too much traction Special care should be taken in placing the patient on the operating table, particular attention being paid to the amount of pressure on the resting arm

While no serious damage results from cutting a nerve, it is well to locate the nerve and retract it to avoid any unnecessary anesthesia or hyperesthesia following recovery Transfixion sutures should be employed readily in cutting the From the Department of Genute Urmary Surgery Smar

Read before Genito Unnary Section New York Academy of Medicine December 18 1935

costovertebral ligament, otherwise troublesome bleeding occurs which delays the operation In an effort to obtain sufficient exposure, care must be taken not to have too much traction against the ribs as a fracture may result, as in one of our cases Unless the pentoneum is gently stripped away from the kidney and kept well ahead of the incision in the muscles there is danger of opening it

In group II-accidents affecting the blood vessels and kidney-there may be accidental hemorrhage from any of the following vessels retropelvic vessel, aberrant renal vessels, main renal vessels, inferior vena cava, abdominal aorta. and adrenal vessel. The possible accidents to the Lidney or adrenal gland are hemorrhage from Lidney substance, hemorrhage from adrenal substance, and beation of an aberrant renal vessel

Many more accidents occur in the manipulation of the organ than in its approach. Unrecognized aberrant vessels undoubtedly play a great rôle in the production of accidents. An unusual amount of handling the kidney as well as the freeing of adhesions in its delivery frequently results in a severe hemorrhage from a torn aberrant vessel (116 per cent) In 1 of our cases a fatal hemorrhage resulted

The greatest number of accidents occur on the right side especially if the nephrectomy is difficult Injury to the vena cava rarely occurs on the

m immediate death

left because of the great length of the renal vein By far the greatest number and more serious accidents occur in the application or following the application of clamps to the pedicle. It is very noticeable from reports that hemorrhage from tears in vessels, principally the vena cava and renal vessels, give the greatest concern to the surgeon The accidents in most instances follow the removal of the kidney Either a clamp slips, a ligature loosens, a vessel retracts, or a hole is torn in a vessel These accidents are always followed by severe hemorrhage resulting frequently

According to reports, the accidental hemorrhage appears more frequently from tears in the inferior vena cava (Chute, Petit, Guerry, Cabot, Phillips, Rathbun, and Walters) than it does from the renal vessels. This is quite contrary to our expenence, in our series we had to cases of

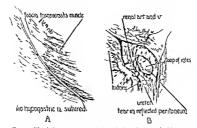


Fig. 1 The duohypogastric nerve sutured after the nerve had been cut. This accident occurred in 3 of our cases. A tear in the reflected peritoneum is also shown. This accident occurred in 4 of our cases.

Cases

5

accidental hemorrhage, none of which was from the yena cava

In any case the accident is a serious one, yet some very excellent results have been reported following the repair. In 4 cases of tear in the inferior vena cava Chute sutured with black sill. a patients died and 2 recovered. Petit reports on to cases in which lateral suturing of the tear was done, and 17 recovered. Cabot had recovery in 2 cases it of which was sutured but clamps were left on the tear for 7 days. Guerry did not employ

TABLE I -ACCIDENTS RECORDED

Hemorrhage

a Main renal-immediate

b Main renal-late 4 c Retropelvic vessels d Aberrant vessels 5 Suprarenal vessels Kidney proper Total 49 per cent Cangrene from thrombosis Diaphragmatic tear Pleural tear Lung puncture Fistulas Duodenal rupture Peritoneum opened Fractured rib Ligation of aberrant vessel-unintentional Evulsion of ureter Severing nerve (iliohypogastric or lumbar) Temporary paralysis of arm Loss of broken needle Total 43 sutures but left forceps on the tear in 3 cases and all recovered Walters reports 4 cases in which the inferior vena cava was opened, 2 intentionally

Sutures were used in all cases and all recovered Other sources of hemorrhage following ac cidents in renal surgery are injuries to the adrenal vessels or gland, also to the retropelvic artery and kidney proper In the removal of a very adherent kidney with perinephritis in which the fatty capsule cannot be separated, a serious hemorrhage may follow Hy man reports a case in which the adrenal gland was unintentionally removed with the kidney Death followed In r of our cases a profuse hemorrhage which followed the delivery of the Lidney but was not coming from the renal pedicle was seen spurting from one of the adrenal vessels, which was ligated and the hemorrhage ceased On evamination of the removed Lidne), half of the adrenal gland was found (Case 16)

Pyelotomy for renal calculus especially in cases in which the pelvis is intrarenal, frequently results in cutting the retropelvic artery causing hemorrhage that at times cannot be controlled. In 2 of our cases perfect kindneys were sacrificed in order to save life (Cases 7 and 27)

Acadental incisions into the kidney substance training a portion of the cortex of the kidney may result in hemorrhage that cannot be con trolled by the usual methods and in order to sate hie, a nephrectomy is necessary. This acadent occurred in our series in 4 cases (Cases 11, 13, 13, 13, and 24).

Aberrant vessels frequently supply a large por tion of a kidney so that judgment must be ever cised before ligating one, otherwise the kidney

No case of injury to the inferior vena cava abdom nal norta large bowel liver spicen or pa creas was encountered

Cases

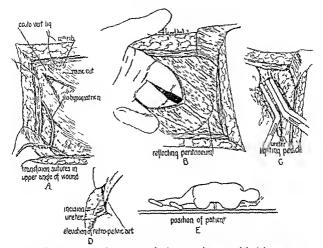


Fig. 2. This drawing shows the best position for the patient, the position of the illohypogastic nerve with the muscle being pulled aside, the method of placing the sutures in the upper angle of the wound to check bleeding of keeping the peritoneum well ahead of the incision in the muscles and of elevating the retropely a cattery.

Operation

may lose its principal blood supply. An accidental ligation occurred in Case to but a subsequent follow up revealed no disorder to the kidney.

In group III—accidents that may occur to the closely, approximated or distant structures—may be found the following (1) opening of peritoneum, (2) injury to duodenium or small intestine, (3) in jury to large, intestine, (4) injury to diaphragm, (5) mjury to pleura, (6) injury to lung, (7) mjury to pancreas, (8) mjury to spleen

Again the undue handling or difficult delivery or the kidney frequently causes injury to the peritoneum (Mathé), diaphragm and pleura (Rathbun, Quinby, and Mathé). In 4 of our cases the peritoneum was accidentally opened with no serious results (Cases 32, 33, 34, 35). In 2 of our cases the diaphragm was injured (Cases 6 and 8) while in a the pleura was torn (Case 6). All recovered. It is more difficult to have an injury to the pleura on the right than on the left side (Fig. 4).

Other serious accidents that may and do occur in the application of pedicle clamps are inverto the duodenum, small bowel, large bowel, and pancreas Injuries to the duodenum appear to be more prevalent Accidents to the duodenum in this manner have been reported by Rathbun, Felber, and Mayo Young and Colston report

TABLE II -TYPES OF OPERATION

Nephrectomy	
a Tuberculous	3
b Neoplasm	3 2 8
c Pyogenic pyonephrosis	8
c Pyogenic pyonephrosis d Calculous pyonephrosis	7
e Pyelonephritis	2
e Pyelonephritis f Hydronephrosis	6
Tetal neck to	
Total nephrectomies 65 per cent	28
Pyelotomy—alculus	3
Nephrotomy-calculus or drainage	4
Sephropexs-renal ptosis	3
Incision and drainage-perinephritic abscess	2
Ligation of vessel-hydronephrosis	1
Plastic hi dronephrosis	1
Decapsulation—nephritis	1
	Total 43

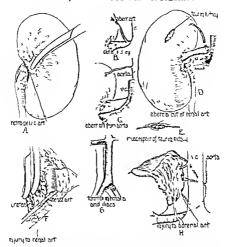


Fig. 3. The vessels that have caused accidental bemorthage in 210 our cases. The drawing shows show easily beloefing can occur from a retropoleric arter; from an abstrant artery from the renal artery which was accidentally cut close to the kid ney, how bemorthage may follow migrit to an abstrant artery coming from the across hich was not caught in the pedicle claups to an abstrant artery, coming from the examinery and cut close to the renal artery and cut close to the renal artery in placing the pedicle claups from injury to the adrenal artery. Muscle repair of a term in the lidder, and the thromboss in renal and since afterness are also demonstrated. This latter accident occurred in 2 of our cases

accidents to the pancreas We have had one accident to the duodenum in our series but none to the other structures (Fig. 5). In our case (Case 9) it did not follow the application of a clamp but the accidental introduction of the finger into an ulcerated portion of the unconsered duodenum in a case of pernephinic ab-cess.

Whipple in the removal of a left Lidney, encountered injury to the descending colon which was ulcerated and attached to the left Lidney

Complete tearing away of the ureter from a kidney as reported by Cowden is not a common accident Unfortunately it happened in one of our cases (Case 21) Since a profuse hemorrhage also existed it was considered advisable by the surgeon to do a nephrectomy (Fig. 6)

In group IV—acadents that may occur un mediately after operation—are included (i) imme date accidents, such as hemorrhage from pedice because of loo-ening of ligature or clamp and (2) late accidents such as (a) hemorrhage, (b) thrombi and emboli, (c) temporary paralysis of upper extremity, and (d) fistulas.

In group IV damage is observed after the ac cident has occurred probably it was not or could not have been noticed in the beginning. Per

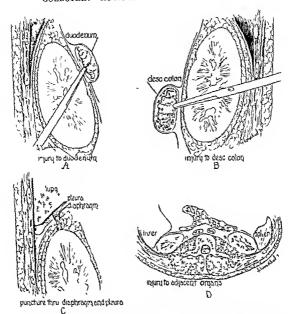


Fig. 4. Here is shown an injury to the duodenum from pedicle clamps, a type which we have not encountered, also injury to the pleura, displaying and lung which we have encountered ut decases, injury to the descending colon, which we have not encountered in our series. The cross section showing the relationship of the kidney to the other organs, demonstrates that it is possible to have accidents to the other organs.

mitting a patient to return to his bed while still occuring blood is a dangerous procedure, yet one is forced to do this in some instances on account of the presence of shock. If at all possible undue hemorrhage should be checked Occasionally there will be delayed profuse bleeding as in 4 cases of our series (Cases 4, 5, 28, and 39) Three recovered because the condition was discovered early and quick action was taken—the wound was quickly packed. One patient (Case 4) deel because of the fact that no effort was made to check hemorrhage.

Pedicle clamps should be placed as close to the kidney as possible so that when the kidney is removed, there will be ample room for the pedicle to retract, thus making ligation sumpler. There is less chance in this manner for ligatures to ship after the patient has returned to bed. In addition, the longer the stump of the pedicle the less chance for a blood clot, which may be infected, to become thrombotic and cause obstruction in one of the larger vessels. In of our infected cases (Cases 14 and 19), the pedicle was tied close to the ab dominal aorta and the inferior tens cava, causing thrombosis of the iliacs which resulted in lower extremity gangrene and death (Fig. 3,16).

Particular care must be taken to remove all foreign bodies, particularly in cases of hemor-

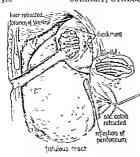


Fig. 3. An injury to the duodenum producing a fixtulous tract in one of our cases

rhage otherwise a fistulous tract will result (Cases 15 and 20)

PROCEDURES WHEN ACCIDENTS OCCUR

Experience teaches new and better methods When an accident occurs, it is of utmost importance to act quickly and calmly

portance to act quickly and caimly
Hemorrhage occurring in the approach to the
kidney can usually be controlled very easily A
very trouble-owne place is in the upper angle of
the wound where the costovertebral ligament is

cut This is best controlled by transfixion sutures through the tissue on each side (Fig. 2, A)

Should a hemorrhage occur from the main renal vessels or from a large aberrant vessel prior to the removal of the kidney, in a case in which nephrectomy is contemplated, we have found that the best and safest procedure is to remove the kidney quickly, as a better opportunity will thus be presented for locating the bleeding point Should the hemorrhage occur after the kidney has been removed, it is best not to grasp at anything but to manipulate with the thumb and index finger of one hand to obtain pulsation if possible or to grasp the bleeder between the fingers and then place the pedicle clamps. Another procedure we have carried out frequently is to pack the wound and make pressure This is sufficient in many instances, while in others the gradual and gentle removal of the pack will permit one to locate the bleeding point. We have never had the occasion to do any repairing to a large vessel as we have never encountered bleeding from the vena cava or the abdominal aorta (Fig. 3,F)

If bleeding occurs from an aberrant vesel which arises from the renal but close to the origin of the renal, it frequently is difficult to fight, so that it may be necessary to remove a kinder to check the bleeding. When the bleeding arree from an aberrant vessel and the bleeding point is in the kindrey, it may be necessary to higher the vessel or to place muscle or make pressure to

check the bleeding (Fig. 3,B,D,E)

Hemorrhage from an accidental surgical tear
in the kidney requires careful attention. One of
the procedures of applying pressure, suturing the

aberrant aftery ligated tear in hydro ureter

Fig 6 A tear in the hydro ureter also accidental figation of an aberrant artery caused an infarct. One of each occurred in our eeries

capsule, insertion of muscle or tying with catgut strips is employed before a kidney is sacrificed

(Fig. 3, D, E)

When the hemorrhage occurs from a retropelvic artery a ligature at both ends is best, but we have had to sacrifice a good kidney in 2 instances (Cases 7 and 27) when this procedure was of no avail and in order to save life we were compelled to carry out heroic measures by removing the kidney (Fig. 3,A).

Hemorrhage from the suprarenal gland or artery is very troublesome and can be checked by ligating the vessel only if sufficient exposure is obtained. It may at times be necessary to remove

the gland (Case 16, Fig 3,H)

Injury to the diaphragm and pleura should be recognized immediately by the hissing noise and should be sutured immediately it possible. Should it occur before the kidney is removed, as it did nour cases, closure should be made if possible. If not it is best to pack it off and remove the organ and then attend to the tear. The question of drainage is important. In our case of pleura tear (Case 6) it was impossible to suture so we drained the area and the patient made an uneventful recovery. A tear in the presence of a pyogenic infection should be closed if possible and the renal bed drained (Fig. 4,C).

Tears into the peritoneal cavity, if recognized, are best attended to immediately by closing the opening tightly and not draining, but the renal

bed should be drained (Fig 1,B)

Injury or hemorrhage from an organ, such as the liver, pancreas, or spleen, has never occurred in our series. Should such an accident occur, suturing around the tear with a tube for drainage to the site of injury would probably control the situation as well as any other procedure (Fig. 4.1D).

Injury to the small or large bowel should be controlled immediately it possible. Closure of the rent is of utmost importance. Drainage should be instituted but only in the renal bed (Fig. 4,A,B)

Severing a large nerve during the course of the operation is not a serious problem. If the ends can be brought together easily with one black silk suture it is best to do so. If such suture is not possible, no serious results occur as frequently the nerve ends find each other Results of this accident may be anesthesia or hyperesthesia around the hip, which usually is only a temporary affair (Fig. 1, A).

Temporarily placing a rubber covered clamp on a pedicle so that a clear field can be obtained while working on the kidney is the usual procedure in our climic Care must be taken not to permit the climp to remain on too long We have left

clamps on as long as 30 minutes at one time without any serious damage, but care should be taken not to obliterate the lumen of the vessels completely in clamping. Our usual procedure in cases of this kind is to release the clamp after 10 minutes and then reapply it.

In clamping aberrant vessels for treatment of obstruction at the uteropellur juncture, it is important to observe, before cutting, the amount of lidnes tissue the vessel supplies. This can readily be determined by observing the change in color. We ligated one such vessel going to the upper pole and cut before making the observation (Case to Fortunately, it supplied only a portion of the upper pole of the kidney. A definite line of demarcation was observed but the patient made an uneventful recovery (Fig. 6,4).

CASE REPORTS

Abstracts of some of the cases in our clinic will be printed in the reprints of this article. In the series of cases there were in all 43 accidents, 3 patients having had two accidents each

RESULTS

These 43 accidents, 12 5 per cent, in 345 operations on the kidney include the entire number that have occurred in the practice of all the sur geons, including assistants and residents, connected with the urological service of the Sinai Hospital Experience undoubtedly affects the situation since an analysis shows that 76 per cent of the accidents occurred in the first 7½ years and 24 per cent in the last 7½ years of the period covered in this study.

We have had the misfortune of dealing with all types of accidents excepting those indicated in footnote to Table I By far the most serious accident in our experience was hemorrhage (49 per cent) from one source or another Thirty, 70 per cent, of our accidents were major ones and the result might have been faital fortunately, how ever, only 8 patients, 20 per cent, of our series died

as a direct result of the accident

An analysis of the 8 deaths shows that 4 were from hemorrhage, 3 patients dying immediately on the table and the fourth patient 4 days after nephrectomy. One patient, following accidental puncture of the pleura and lung, developed a hydrothorax and pneumothorax after nephrectomy, which caused death. One patient with a permephritic abscess died from sepsis and shock following rupture of the duodenum. Two patients died as a result of thrombosis of the three vessels, following nephrectomy. Two other deaths occurred in the series but were not attributable

directly to an accident 1 patient developed pneumonia and died on the eighth day, the other died of bichloride poisoning

In o cases it was necessary to sacrifice a kidney because we were unable to control bemorrhage In 2 of these the source of the bleeding, which could not be controlled, was an aberrant vessel. and it was necessary to do a nephrectory, in 2 cases immediately and in the other case later. In 2 of the 6 remaining cases immediate nephrectoms was necessitated by uncontrollable hemorrhage from a cut retropelvic vessel. In the 4 other cases immediate nephrectomy was necessary to control hemorrhage which resulted from an accidental injury to the kidney

SUMMARY AND CONCLUSIONS

In 345 operations on the Lidney there were

43 accidents an incidence of 12 c per cent 2 Eight patients 20 per cent died, 4 from hemorrhage

3 Hemorrhage was responsible for 49 per cent of the serious accidents

Nine kidneys were sacrificed because of un controllable hemorrhage, but in these cases there were no deaths. In a patients the bleeding came from injured aberrant vessels, in 2 from injured retropelyic vessels, in a from the kidney proper

If possible all bleeding should be controlled before the patient leaves the table

6 Clamps should be left on the pedicle, with

out hesitation when necessary 7 Pedicle clamps should be placed with great

care Opening of the diaphragm, the pleura, or the peritoneum is not a serious accident. If possible such rents should be closed but the renal bed should be drained

 Opening into any part of the intestinal tract is a serious accident and closure should be done

ımmediately

to The fracturing of a rib or the cutting of a nerve is not a serious accident, nature will take care of such injuries

II The proper position of the nation on the operating table, the making of an exposure suffi ciently large for the operation, the exposure of the nerve, the keeping of the peritoneum well ahead of the incision, are all important factors in kidney surgery

12 The separation of adherent bands and heation of aberrant vessels, the careful manipula tion of all structures, the proper thinning out of the pedicle and the placing of clamps so that the pedicle can be ligated—all these factors will prevent many hemorrhages

12 Violent retractions should be avoided

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PEDICLE FLAP PATTERNS FOR HAND RECONSTRUCTION

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HE delicate hand balance with its multiplicity of synchronized motions is dependent upon the normal functioning of the numerous structures of the hand, including the dermal covering. A disarrangement of any of these structures has a material effect on total and partial hand movements. We will concern ourselves in this discussion only with the coverings of the volar and dorsal surface of the hand and fingers, and the methods of repair

In all serious hand injuries requiring dermal replacement, the damage is not confined to the skin alone but there is consequent destruction of the subcutaneous tissue This being true, the ideal method of replacement is that which will supply a pattern of skin and subcutaneous tissue in one piece so that the optimum in hand function and appearance can be assured From a practical viewpoint, however, under certain conditions, one may employ substitute measures which will fill the needed requirements and give gratifying re sults. With this thought in mind it behooves us to compare the use and application of the three standard methods of hand coverage (1) the split skin graft, (2) the Wolfe graft, (3) the pedicle flaps as they are applied to our problem

The split skin graft and the Wolfe graft are practically identical in their usage, but the tech nical difficulty in handling a Wolfe graft as well as its precarious postoperative course limits the usefulness of this type of graft. When there is a loss of the derma without exposure of the deeper structures, the split skin and Wolfe grafts are available Of the two, the Wolfe graft functions better on the volar surface of the hand and fingers due to the fact that less contracture takes place in the grafted bed under a Wolfe than a spht skin The split skin graft does not wear well on the palm, occasionally being involved in a localized dermatitis or giving rise to a painful hand because insufficient protection is given to the underlying delicate hand structures Because of its ease of application and of the more certainty of a take, the split skin graft is more frequently used on the hand and finger dorsum under limited conditions These two grafts perform their functions best as coverings for the lateral aspects of the fingers, the

Read before the Industrial Medicine and Surgery Section of the California Medical Association Coronado May 22, 28 2036 interdigital webs, including that between the index tinger and the thumb and the hypothenar eminence These are relatively silent areas with very little stress or strain and a dermal type graft is sufficient coverage. The split skin grafts are also used to great advantage as temporary measures to cover ulcers, as immediate replacement in potentially infected acute hand injuries, and in those chronic hand deformities in which there have been marked contractions requiring gradual elastic traction before full and permanent coverage is contemplated Neither the Wolfe or split skin grafts are advisable over exposed joints, bones, tendons, or nerves and should not be used when future nerve or tendon grafts are planned The lack of a subcutaneous tissue buffer makes them unacceptable for this type of repair

Although the patterned pedicle flap per se is not our only means of hand coveringe replacement, its anatomical construction fulfills the evisting requirements for a more normal reconstruction than other available methods. This fact combined with their versatility of application and independent blood supply are the basic reasons why they have been so successfully employed to date and further recommends their more universal usage.

Several general principles concerning pedicle flap patterns should be considered when their use

is contemplated

1 The usual donor areas for hand repair are the abdomen, lower chest, thigh, and buttocks, the selected site depending upon the ussue avail ability as well as the type of material needed and the location of the injured area.

2 A one piece pattern of the exact size, shape, and thickness will give the most efficient result

3 All pedicles and flaps, when possible, should he made to conform with Langer's skin lines and the district blood supply

4 Venous stasts due to the lack of a blood channel outflow rather than a deficient arternal supply is generally the offending cause when tissue necrosis occurs Multipedicle flaps correct this venous deficiency.

5 Bapedicle or multipedicle flaps are more certain of a complete take than unipedicle ones and should always be used whenever there is any question present as to the viability of the donor material



Fig. t. a. Burn of dorsum of hand with loss of extensor tendons. Thin scar over metacarpal bones. b. Bipedicle abdominal flap replacing scar on dorsum of hand. a single

unit of skin. The abdominal skin approximated beneath hand c Dorsum of hand completely covered with pattern pedicle flap cut very thin. Note how it blends with hand,

The question as to the use of more than one nourishing pedicle to the detries oubstutaneous parties it ent is an individual matter and depends upon the experience and judgment of the surgeon. However, there are several situations that are better met by using multipedicles. (1) when it is necessary to cut across the blood supply and Langer's lines to obtain the necessary donor material (2) when the area to be graited is over 1 square inch (3) for all flap patterns on the volar surface of the hand and ungers (3) when the pattern of the area to be graited is over 15 for total inger or thum reconstruction (6) when it is

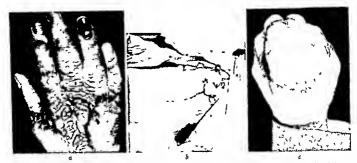
necessary to reduce the subcutaneous tissue to a minimum to obtain the proper flap thickness, (7) when due to the mechanics of the hand and arm an unreasonable stress or strain is placed in the limb when it is connected to the donor ard (8) when due to malposition of the opposing area donor or recipient) undue tension or tossion is

imposed on the pedicle or flaps
A tubed pedicle flap in which the tubed pedicle
is first made and later one end used is the be t
procedure for total digit covering. These pedicle
may be modified at the time of application to
meet the needed requirements an example of the



Fig. 2 of Third degree burn of hand. Tissue cooked as far as the middle of the hand. Imputation advised the where but refused. b Abdominal tubed pedicle to index finger on the dorsal surface as far as the middle phalangeal ourt and on the volar surface into the palm. c Second.

abdominal pedicle to middle finger then when abdominal end is cut free the pedicle is sutured to palm and liter used to cover the ring finger of whother pedicle used to cover the little finger. Flexion of fingers to right angle at metical pophalangeal joint and thimb approximates all fingers



Lig 3 a Casoline burn of hand and fingers with un yielding keloid scar holding fingers in extension b, Bipedicle patterned pedicle flap to hand and fingers to replace scar

c, Complete replacement of sear on the hand and fingers permitting full flevion of the tingers and thumb

being that in which the whole volar surface, but only one-half of the dorsal surface of a digit needs replacement. Also, the same tubed pedicle just described may be used to cover other digits once having obtained its independent blood supply from its new location

The dorsal coverings of the hand or fingers can be readily constructed by pedicle flap patterns when the abdomen is used as a donor area, be cause the hand can be placed in a comfortable position. The question as to the number of pedicles required can be answered for the individual problem by adhering to the criteria stated Usually the creation of previous tubed pedicles for flap pattern blood supply are not necessary as the direct application of the flap pattern with at tached pedicles can be accomplished in one proce dure. If tubed pedicles are first constructed they not only increase the number of surgical proce dures and prolong the disability, but the tubed

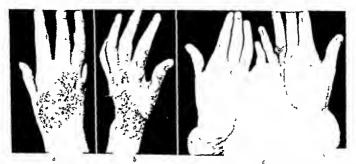


Fig 4 a \ ray burn right hand result of x ray treatment of skin warts. Function of tingers interfered with b ray burn of left hand result of v ray treatment of skin warts Function of fingers interfered with c. Complete

removal of scar and replacement with thin pedicle flap patterns from abdomen Restoration of complete flexion and extension of fingers, as well as normal dorsal arch of



Fig 5 a Traumate amputation of thumb through the prounal head of the metacarpal b Abdommal tubed pedicle used to reconstruct the soft tissue c reconstructed thumb extremely useful for approximation to fingers d Roentgeogram of lone graft 5 years after implant showing the density of graft and other band bones about the same

portion per se when required as part of the donor material does not lend itself well to flat surface reconstruction

The replacement of the coverings of the volar surface of the hand and fingers, when the usual donor area the antenor abdominal wall, is used, presents perpletung problems due to the mechanical difficulties encountered when the hand is approximated to its donor area. These difficulties can be overcome for small areas of tissue replace ment by the creation first of a tubed pecific and then in 2 or 3 weeks' time, by the elevation of the desired flap pattern at the appropriate tubed end. The tube not only serves as a blood supply for the flap but it also brings the flap pattern into a more accessible position for its final application. When larger flap patterns, such as to cover a palm, or palm and fingers, are required at least two tubed pedicles should be employed to insure ade quate blood supply and venous return. These tubes should be so placed in regard to the flap as to insure the best nourishment for the flap as well as for obtaining the most advantageous position for the hand when the flap is applied to the denuded area.

All donor areas from which flaps are taken should be approximated at the time the flap is being used. If this is not feasible, due to the size of the skin pattern, immediate split skin graffing of the denuded donor area should be done. These grafts will take practically 100 per cent, so that eventual raw area and sear formation is materially decreased. When any flaps are applied the tissue to be replaced should be properly reflected by adequate incision to serie as a covering for the exposed surfaces of the serving pedicles. This procedure reduces the raw area, dimnishes the chance for infections, and often converts an open epithelial system into a closed one.

The application and management of the grafted tissue are two other important phases of this form of reconstructive surgery. There are certain general rules to be followed if one expects to obtain the

best end results

r The donor flap should be cut as a duplicate pattern of the denuded injured hand. This supplies sufficient covering material, keeps all the elements in the flap, including the vessels under normal tension and in proper relation to each



Fig. 6 a Kelord scar on dorsum of hand and fingers result of gasoline burn. Patient unable to flex fingers thumb or wrist due to the check rein like action of the dones scar b Haod in situ under abdominal glove flap. Seven pedicles can be seen one exch for the fingers and thumband one on the radial side and one on the ultart side of the hand Position of hand quite comfortable c. Abdominal area.

after glove pattern removed showing defect closed by split skin grafts applied simultaneously with making the peddee pattern of Complete overage of hand and insperwith a thin one piece peddee pattern of skin after the scar was removed e Complete fleano of the fingerand thumb as well as restoration of normal dorsal arch and knuckles other, thus obtaining the optimum condition favorable to flap vitality

2 There should be an absolute hemostasis of the recipient area and the donor flap. This prevents postoperative hematomas that are so de structive to grafts and stimulates circulation in the patent flap vessels.

3 Accurate approximation of the flap pattern

to its bed eliminates dead spaces

4 Exact apposition of the flap skin edges to those of its new position puts the flap edges under the best condition for early union by first intention and gives the eventual minimum in scar formation.

The time of severance of the blood supply to any of the pedicle flaps is entirely an individual problem. The average length of time for severing accessory pedicles is 7 to 10 days and it is not advisable in the case of a large flap pattern with many pedicles to interrupt too many at the first sating The average time for the severance of the terminal pedicle that makes the flap self sustaining is 2½ neeks. There are numerous things that influence the surgeon's judgment as to the proper time to isolate the flap from its pedicle blood supply, such as (1) the rapidity of the take, (2) the size and circulation of the graft, (3) primary graft umon, (4) presence or absence of infection, (5) number of nourishing pedicles, (6) the local conditions surrounding the graft, and (7) the general condition of the patient

The pedicle flap pattern, by its anatomical construction, more closely fulfills the major requirements as a replacement usue for all serious hand injunes requiring a covering, therefore, when properly conceived and executed it gives the most favorable means for obtaining the acme in appearance and function. It is upon these con siderations that we recommend its more general application in major hand injunes.

RADICAL OPERATION FOR CANCER OF THE RECTUM WITH PRESERVATION OF THE SPHINCTER MUSCLE

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HE operation to remove cancer of the rectum has recently been standardized in this country in practically all cases to include the routine removal of the anal sphincter There has also been a definite trend foward the combined abdominonerineal operation The necessity of routinely sacrificing the rectal

sphincter is debatable. In many cases sphincter preservation is justified according to recent im

portant pathological research of Westhues

The importance of Westhues work is that it contradicts Miles findings According to Miles, cancer of the rectum, by lymphatic spread, in volves the sphincter muscle, the peri anal skin. and the ischiorectal fat. If Miles is right in assuming this downward spread of cancer of the rectum, it becomes necessary to sacrifice the sphincter muscle Practically one never finds metastases in the inguinal glands in cancer of the

ampulla of the rectum

Westhues a German surgeon, in his recent work denies this downward spread Westhues proves this by a thoroughness of investigation unequalled in research of cancer of the rectum From the Department of Surgery Stan ord University Medi-cal School San Francisco Presented before the Surgical Section of the California Medi at As ociation So emite Valley May 15

Fig. 1 Voelcker's incision for sacral operation of cancer of the rectum (Reproduced from Nordmann Chirurg 1931 p 677)

To illustrate (1) by extracting the fat every specimen is made translucent and examined under transillumination (2) every little nodule shows clearly and is numbered, (3) serial sections of each node are examined microscopically Westhues applied this painstaking method in 102 operative specimens, in which the most radical abdominopermeal type of operation including removal of the sphineter, had been done. There were found 210 metastatic cancer nodules Only one of these was located below the level of the lower edge of the neoplasm. The 200 remaining were situated at the level of the cancer or above, along the hemorrhoidal artery and its branches Westhues therefore, is in a position to state emphatically that the perirectal tissue below the cancer is prac-



Fig 2 Coetze operation Showing the pelvic fascia loosened up to the promontory Incision of cul-de sac on night side (Reproduced from Goetze Zentralbl f Chir 1931 p 28)

tically always free from metastases. The situation is similar to that present in cancer of the stomach Here the lymphatic spread toward the duodenum is almost negligible compared to the upward spread along the lymphatic vessels of the lesser curvature.

In cancer of the rectum, on the other hand, Westhues further demonstrates that, in upward direction, cancerous glands originating from the tumor are usually not found higher than to centimeters above the neoplasm or anatomically above the level of the sacral promonlory. Metastases of cancer in the glands of the mesosigmoid are not nearly as common as Miles would have us believe. If the glands of the mesosigmoid are involved, no matter how radically one operates, there is bardly any chance of a permanent cure

Miles' well known diagram correctly pictures all possible ways of lymphatic spread. Nevertheless, for all practical purposes, we have to deal mainly with the commonly involved retrorectal glands situated along the branches of the superior hemorrhoidal artery up to the level of the promontory. Westhues' findings conclusively show that below the level of the tumor, cancer glands are not found, and that above the level of the promontory, glandular in ohement is rare as to the frequency of the lymphatic metastases, we may assume that at least 50 per cent of all rectal cancers have lymphatic involvement. The figure given by the Majo Clinto is 43 per cent

The above considerations refer particularly to the extramural lymphatic spread of rectal cancer. In the spread by continuity, cancer of the rectum extends only about one half inch upward and

tum extends only about one half then upward and downward beyond the visible or palpable edges of the tumor. This conforms with Miles' statement, "the spread of caucer in the submucosa is very limited and does not extend much beyond the edges of the neoplasm." If the lower edge of the malignancy is more than 1½ inches away from the sphineter, there is no objection to saving that soluncter.

While cancer of the rectum has a tendency to remain localized within the intestinal wall for a considerable time, in a certain number of cases the mahgnancy will penetrate by continuity through the bowel wall and invade the surrounding perirectal tissue. Even so, the growth of the cancer does not immediately become unfinited it hesitates a long time before breaking through the visceral fascia of the pelvis. Here again we are in conformity with Miles. It is only after penetration of the visceral fascia that the neighboring structures will be invaded, namely the sacrum, uterus, vagina, prostate, and bladder.

In other words, the visceral fascia of the pelvis forms a fairly rehable natural barner, a musculo-membranous tube—contaming the cancer in its interior. In removing cancer of the rectum the visceral fascia is a natural guide for the surgeon, an important point in operative technique.

In the operation for cancer of the rectum, the following objectives should be emphasized

The retrorectal glands and the rectum covered by the natural sheath of the visceral fascia should be removed up to the level of the sacral promontory, as the kimphatic spread is in upward direction. On both the left and right sides, in the latitudinal direction all perirectal tissues should be removed as radically as possible.

2 The anal sphincter should be saved more often because the downward spread is rarely more than I inch from the lower edge of the cancer, either by continuity or by lymphatic extension

To accomplish these objectives, surgery has two competing methods, namely the combined abdo minoperineal operation and the sacral route

It cannot be denied that even in the most experienced hands, the operative mortality of the combined abdominopenneal operation is two to three times as large as that of the sacral operation It is very doubtful whether the higher operative mortality is offset by a higher percentage of 5 year cures. The fact is, that the combined abdominoperineal operators have hardly been able to surpass the statistics of the sacral operators It is interesting that Kirschner, one of the most experienced and progressive surgeons in rectal surgery, formerly a strong advocate of the combined abdominoperineal operation, has re cently returned to the sacral procedure. Two large parallel series, comparing both methods, had shown more patients were alive 5 years after the sacral operation, than after the combined abdominopenneal operation

If one wants to preserve the sphuncter, the sacral operation has great advantages over the combined abdominoperineal procedure. Sphine-ter preservation means an additional risk in any type of operation. To these dangers and difficulties, the high mortality of the combined procedure would have to be added. If one sacrifices the sphuncter, the entire procedure can usually be carried out in an aseptic manner. If one saves the sphuncter, contamination during operation, leakage along the suture line, and bowel gangrene are to be feared, as it is often impossible to judge correctly the blood supply.

There has recently been a great advance in the technique of the sacral operation, developed on the basis of Westhues' research. This improve-



Fig. 3 Delivery of rectosigmoid from sacral wound. The utures closing the cul-de-sac are shown. (Reproduced from Goetze. Zeneulli f. Chr. 1934. No. 14, p. 800.)

ment is the Goetze operation which allows re moval of much more think by the sacral route than in the Lucal Kraik or posterior resection type of operation. With the exception of the skin inclion, I have therefore adopted the Goetze method the steps of which are as follows.

TECHNIQUE

The skin incision is made from the right side of the third sorral vertebra transsersely across the midline over to the left and downward in a slight curve about inches to the left of the raid line ending on the left side of the amis. This is Voelcher's incision (Fig. 1) which I prefer to the V shaped incision of Goettee (Fig. 2)

Not only the coccyx, but also the fifth and half of the fourth sacral vertebræ are removed

The entire pelvic tissue is loosened in its poste nor half by pushing the pelvic fascia blunth away from the sacrum up to the level of the promontory and as far laterally as possible

The cul-de sac which normally extends downward to about the level of the sacrococcygual junction is opened on both sides of the gut first to the right and then to the left of the median line

A gauze strip is placed around the rectosigmo d from these two openings. This strip is used for traction so that the mesorectum can be stretched and the superior hemorphoidal vessels dorbly heated and cut at a much higher level than is ordinarily done in a secral operation. This light to not fit he attery when done in this manner will usually be above the so called critical point. In this way the main source of arterial and vinous circulation of the rectum is severed at the begin mine of the operation.

Now the rectum is freed from above downward, instead of in the usual way from below upward, instead of in the usual way from below upward, Digging around in the cancer infested perintent fat is in this way, entirely avoided. The secret for the second operation, if so done, meets all the requirements of completeness. One has to watch out for the ursteers as they are carmed forward with the visceral fasca by the initial maneuver of the operation. They are much more in danger than in the usual posterior resection. I have placed eatheters into both ureters immediately before the operation in difficult cases.

For the restoration of the continuity of the bowel several methods are available. The procdure depends upon whether a vers short space ter portion is left after cutting across the rectum below the tumor, or a comparatively long lower stump.

If onk a very short spinnets portion can be saved Hochenge is telescoping procedur is the best. The cut end of the bowel strainly the lower most point of the sigmoid, is drawn through the anal portion. There must be no ten non on the bowel a long loop of sigmoid is required. In cases in which it is possible this procedur is satisfaction. It is simple and faint clean, the satisfaction It is simple and faint clean, the satisfaction of the bowel being outside of the min wound. Full continence after the procedure is achieved in only two-thirds of the cases. The sphinneter is often damaged or a firstly remain-

If there is a fairly long lower stump there on ton of continuity is more saturation. This is usually found in the case of an early high recal cancer or cancer of the rectosigmoid. In this case one can do an end to-end anisatomous of the rectum. Primary union practically never cours. After a few days the sature line usually open, the upper bowel becomes gangemous and a senous pelven infection takes place.

For these reasons I have discontinued the immediate end to-end ann. 'omous of the rectum. Instead I use Kiettners method, which is a kind of Mikhitz procedure in the sizeral wond. Kiettner after trung the blood supply and free. The bowel leaves a long loop of bowel with the neoplasm unopered in the sacral wound which is protected by a gauze packing. After 24 or 45

hours, the tumor area and a large section of the howel above and below will show beginning gangrene Demarcation will show clearly One can immediately resect the rectum at points which have been previously marked by a few statches well above and below the tumor, and anastomose the bowel end to-end The advantage is that we are now anastomosing two bowel ends, the blood supply of which is assured, so that primary union is more often achieved Nordmann units until the fifth day before doing the secondary operation. No anesthetic is neces-This procedure is painless By waiting longer, one has the advantage of a granulating pelvic wound which is somewhat protected against infection. Due to the packing of the large wound -bacterial invasion through the gangrenous bowel wall being slow-a severe infection is the exception. This has been shown in a large series

of cases

I am using a slight modification in the manner of clamp resection by immediately resecting the bowel by cautery over crushing Payr clamps, which being too awkward to be left in the wound are replaced by lighter, but tightly gripping, clamps immediately or at the first change of dressing As soon as abdominal distention threatens, that is, after about 3 days, the clamps are removed and an end to-end anastomosis can be done as previously described. If a preliminary colostomy has been performed, which I usually establish on the left side of the transverse colon, the removal of the clamps and the anastomosis may be deferred until the end of the first week after operation I have also recently omitted the end-to-end anastomosis The spur formation that results from a clamp resection I climinate by "spur crushing" about 2 weeks after the operation Spontaneous closure of the posterior wall will often take place. This is facilitated by the curved meision of the skin

If the posterior wall of the rectum fails to unite within a few months the resulting small or large fistulous opening is closed by a secondary operation. We must mobilize the rectal will, a step which is not easy in the scar tissue. So far, I have succeeded every time in closing the posterior defect of the rectum and achieving complete continuity and bowel control. A valuable technical help to me has been the use of a flap shaped incision of the slan at the secondary operation. This flap is very simply formed by extending the curved incision of the first operation downward on the right buttock forming a large flap with its base in the anal region. This flap is very helpful for covering the posterior line of anastomosus, and

giving support to the sature line Persistent fistulas which may form on the sides of the flap more often beal spontaneously. If one mobilizes the upper rectal stump properly, stenosis at the sature line does not occur

If too much howel has become gangrenous, the gut may be too short for end-to end suture Usually it is at least possible to unte the anterior wall. If not even this can be done, the upper and lower lumen are left completely apart, which amounts to a sacral anus for the time being. Liven in these cases, continuity can sometimes be restored. About half a year afterward, the bowel will have stretched and often will have prolapsed somewhat. Then it is usually possible to connect the upper lumen with the sphincter portion.

The Kuettner procedure requires a fairly long lower stump of the rectum, more so than Hochenegg's telescoping procedure. It is excellent for cancer of the rectosigmoid junction, which lends itself especially well to sphincter preservation and in my opinion is best handled by the Kuettner method. The advantages of this procedure are

- The main operation is shortened and shock is lessened
- 2 Infection of the large pelvic nound does not become as serious as in the case of immediate anastomosis
- 3 Anastomosis is done under more favorable circumstances, because at this time we are sure of perfect blood supply

The greatest difficulty in sphincter preserving operations is to deliver sufficient length of bonel to re establish continuity For radical operation, we consider it essential to tie the superior hemorrhoidal artery at the level of the promontory The entire bonel below that point may then lose its blood supply because it is not always possible to preserve the marginal arc, which necessitates drawing on the sigmoid to re-establish continuity This is only possible if there is a long loop of sigmoid All cases of short sigmoid, especially in stout patients, are unfit for this type of sphinctersaving operation. Our efforts to save the sphincter are hunted on one side, by the proximity of the cancer to the sphincter muscle, and on the other side by the shortness of the sigmoid loop Sphincter preservation is possible only in selected cases The age of the patient, his resistance, the grade of the malignancy of the cancer, the length of the mesosigmoid, must be considered. The final decision can be made only during operation Although a harrum enema will give one a fair idea as to the length of the sigmoid, one cannot promise the patient restoration of continuity before the operation

How often the sphincter can be saved varies in the experience of different leading continental surgeons. Two of the largest series are those of Hochnenge of Vienna and Ruettner of Breslau Hochnenger reported almost 1000 radical operations, in about 250 of which the sphincter could be saved Of these 33 per cent were 53 car cures Kuettner among about 600 radical operations, restored continuity in about 250, with a 5 sear cure of 40 per cent. In 1934, Finsterer reported 179 excisions of the rectum for cancer. The sphincter was saved in 127 cases equal to 70 per cent. In 65 of these 127 he operated by the abdominopenneal route (mortality 23 per cent), in 62 by the sacral route (mortality 23 per cent), in 62 by the sacral route (mortality 23 per cent), in 62 by the sacral route (mortality 23 per cent).

The procedure is further complicated by the necessity of decompressing the bowel In all cases, except the most favorable unobstructed ones I prefer to de a preliminary colosions. The great advantage of a preliminary colosions is not only the detoxication of the patient but also the protection the colosions, affords to the serial wound, and to the suture line of the rectum At this time it is important to explore the abdomen for liver metastases, the extension of the neo plasm the presence of metastatic glands, etc. These factors will determine whether sphancter preservation should be attempted or not

The procedure, of which I have been discussing the different steps means a 4 stage operation

r Low midline exploratory laparotomy Colos tomy on the left side of the transverse colon from a separate stab incision

2 Main operation by Goetze method

3 The third major stage consists of closing a posterior defect of the rectum, utilizing the large skin flap already partly formed at the second operation

4 The fourth stage is the closure of the trans verse colostomy

In favorable cases the exploratory laparotomy and prelumars colostomy can be omatted, making only two, or even one, operation necessary if primary innon of the rectum takes place. While the four stage procedure is tedious it greatly diminishes the dangers peculiar to the segmental resection of the rectum. If the pattern achieves normal bowel control the result justifies the prolonged procedure.

In an abdominoperineal operation continuity can be restored in the same manner as in a sacral operation. In using an abdominoperineal operation many variations in procedure are possible which cannot be discussed within the scope of this article. When restoring continuity in an abdom inoperineal operation I prefer again to use the

Luettner principle namely, the delivery of the sigmoid loop into the sacral wound with immediate clamp resection and later anastomous. Only the cutting of the superior hemorrhoidal artery and mobilizing of the rectosigmoid are done from the laparotomy.

For the surgeon who becomes familiar with the improvements in the sacral operation alforded by the Goetze procedure, the delivery of a cancer of the pelvic colon entirely from below appears satisfactory, that the combined abdominopernois operation becomes less and less often necessary. The everptional cases, such as large adherent tumors of the rectosigmoid, will be recognized at the time the coloistomy is performed. These will be subjected to an abdominopernical operation with or without scanfice of the sphincter.

Occasionally one will find more favorable conditions at the time one intends to do the colostom; than one bad expected. In this case I have utilized the laparotomy for immediate mobilization of the sigmoid and rectosigmoid, cutting the superior bemorrhoidal vessels and then delivering the rectosigmoid from a quickly established sural wound. It must be admitted that preservation the marginal arc of the rectosigmoid is easier when done from a laparotomy. The clamp treet tion is done in the posterior wound and the con

tinuity restored at a later date

The procedure just described and the 4 stage
operation previously outlined appeal most to me
at the present time

SUMMARY

r According to the recent valuable research of Westhues a downward spread of cancer of the rectum occurs only very exceptionally. A distance of 1½ inches between the anal sphincter and the lower edge of the neoplasm permits one to at tempt sphincter preservation.

2 Cancer of the rectosigmoid and early cases of malignancy in the rectal ampulla deserve the attempt to restore rectal continuity and normal bowel control

3 Sufficiently radical surgery can be done from the sacral route by employing the new sacral operation of Goetze

4 The technical difficulties of restoring the continuity can be overcome by the Auettner method, or better, a clamp resection in the sacral wound, sometimes by the telescoping procedure A preliminary colostomy on the left side of the transverse colon is usually advisable

5 The temptation to operate too close to the noplasm must be strictly avoided if preservation of the sohnocter is attempted

6 Only in selective cases should preservation of the sphincter be attempted. Age of the patient, constitutional type, length of the sigmoid, and other factors must be considered, the decision to be made during the operation

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TRANSVESICAL CLOSURE OF VESICOVAGINAL FISTULAS

Employment of the Young Technique for Inaccessible Vesicovaginal Fistulas

MARION DOUGLASS, M.D., FACS, Cleveland, Ohio

t.OSL.RE of high vesico aginal fistulas is one of the most difficult and exacting of all surgical procedures. The fistulas in portions of the antenor vesical vall, which are easily available and in which the uterus is in sidi, may on the other hand be operated upon elatively easily by the classical method or one of its numerous modifications. The majority of gnecologists have always favored vaginal closure by the Sims method and attack by other routes has in the past been entitized as unnecessary or ill chosen. However in certain cases it is wise to borrow a leaf from the book of the unpolesst

I wish to report 4 cases of difficult vesicovaginal iistulas each closed in one attempt by the transvesicalroute, originally proposed by Trendelenburg

This method was first employed by Young in a patient who had been subjected to eleven previous unsuccessful operature attempts to repair the studia. This number of fulurers is in itself a strong suggestion that another technique beside the classical method of closure has its place in certain cases. The essential cardinal principles originally developed by Vatron Sims, of good exposure closure by suture and catheter drainage apparently are not always obtainable.

By a deep Schuchardt incision many comparatively inaccessible fistulas (Ward) can be reached and the objection has been raised that the transvescial approach is unnecessary. In our hands however, it has been of value in cases with marked fixation due to repeated unsuccessive attempts at closure and particularly in those cases in which the fistula is closely adjacent to the ureteral ornfice, or those in which the uterus has been removed. Transportioneal closure has been advocated by Legueu and recently by Walters, the latter employing the omentum as a dam plugging the opening

CASE: This patient was a white married woman aged 45 who had had a food hystercomy 2 sens presum J. by another surgeon. She had developed a vessowagusal situal at the time of her discharge from the hospital. An unsuccessful attempt at closure was made on March 9 1927 by the classical method catgut being used. The fistella was posterior to the interinretier ridge slightly to the right and about 1 centimeter posterior to its median.

From the Department of Obstetrics and Gynecology Western Reserve University School of Medi line and the University Hospitals portion. Due to its marked inaccessibility at the aper of the vaginal vault it was decided to attempt the transserved method as advocated by Neuron.

sexual method as advocated by Young Suprapulse unasson was made (Fig. 1). The fistula was elevated by means of a safety pun in the form of a book and the mucous was carefully naced and reflected from the fistula. Concentre paraestring a turnes were placed and the seagonating the first hand to supra. The mucous was satured with interrupted chromic categor to and the anterior bladder wall was also with interrupted chromic states to with the safety of the safety

This patient was placed on the abdomen as advised by Joung and Chine and she was kept in this position for 13 days. We have employed this method in all such cases and expand at a scrimmely valuable on protecting the version vaginal natures the bladder being kept enturely empty. This patient developed a small postoperative vintral bernis which was repaired a year later. She has had so further leakage.

Cast 2 The patient was a marmed woman aged if years who entered the hospital April 19, 19 o She complained of unnary incontinence. She developed a fittle following a radical Nerthern operation for squamout cell carcinoma of the cervis.

Cystoscopy revealed a vencovagunal fistila 2½ centi

Associately revealed the control of the blodder of the property of the mean temperature in the Supreplus cytology was performed exposing the floor of the blodder. Be studies opening was readly seen and was elevated on a small block. The mucosa was incased transversely and the mucosa undermined dustably which deuted a small block. The mucosa was incased transversely and the mucosa undermined dustably which deuted a small elliptical area of vessel mucolature. A slik purseture plain interrupted categor as a diocated by Young were superimposed We did not hesistate to use the chromate categor for the superimposed interrupted categor and the property of the superimposed interrupted categor and the superimposed of the super

The first 2 cases were done in conjunction with Dr James Joelson of the Urologic Service of the Lakeside Hospital.

Cast 3. This patient was a white married femile, and at years who had been operated upon three times unsue cessfully for clower of vescovagual fatula. Cystoscopy recaled a fixtulus treat anterior to the left unertail orance quite high an po thom in a line approximately it continuets from the urethra and in the line between the stretchal centre and the left unretrail orance. The surprapies required with the same technique through a suprapies to the same technique through the superapies of the contrained of the same technique through the contrained in the bladder. Recovery was unevential. The patient was able to void postaneously. She was kept face downward it days when the cathette was removed from the suprapolaneous The would healed rapidly. The patient was discharged on the fifteenth day, voiding normally and com pletely continent

CASE 4 A white woman, aged 30 years, developed incontinence of urine following panhysterectoms in another state from an unknown cause This is a patient of Dr Hersbberger of Tiffin, Ohio Cystoscopy revealed a fistulous opening approximately in the midline just posterior to the interureteric ridge. Closure by the classi cal method was attempted. A modified Schuchardt incision was made, the repair being attempted with No o chromic catgut by the method advocated by Lower This operation was unsuccessful leakage recurring in 6 days and r month later the patient was operated upon by the transvesical toute Two pursestring sutures of No oo catgut were placed about the fistulous tract which was everted toward the varina. The mucosa was then closed with No co. chromic catgut sutures the tract having been well elevated by means of a safety pin, made into a hook. Suprapubic drainage was made with a large tube as in the other cases in this series. The patient was kept on the abdomen. The indwelling catheter was removed on the fourteenth day and the patient was discharged on the thirty third day after the second operation. She has remained free from recurrence of leakage

We have employed suprapubic dramage into the space of Retzius for 24 to 36 hours in addition to the resical tube We have also found elevation of the fistula by means of a small hook or safety pin, following the suggestion of Dr Young, superior to elevation on an assistant's finger in the vagina, although theoretically the latter maneuver should allow the best exposure. The exposure, however, of an indurated fistula on a small hook is enumently satisfactory and experience with this method has been highly grati lying and we feel justified in recommending it particularly in cases in which, due to absence of the cervix or inaccessibility of fistula through scar tissue fixation, adequate exposure from below, even aided by the Schuchardt incision, is difficult

The availability of the operative field and the relatively easy exposure of the fistula can scarcely be imagined by one accustomed only to employing the much more difficult classical approach in cases in which there is no cervix uteri to use for

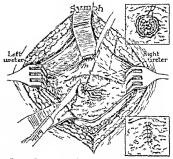


Fig t Circumcision of vesical mucosa surrounding the vesicovaginal fistula by an elliptical incision. The sur rounding mucosa is gently and carefully elevated and dissected away from the site of the fistula leaving a small raw area of bladder muscle. The fistula is posterior to the interureteric ridge and slightly closer to the right ureter Right upper inset shows concentrically placed pursestring sutures. As these are tied from within outward the fistulous tract is evaginated toward the vagina. Three pursestring sutures are placed Lower right inset shows mucosa closed with interrupted catgut sutures

traction. The field can be kept absolutely dry, sutures can be placed accurately with little or no trauma of tissue, and we feel justified in recommending it as the method of choice in the treatment of small but maccessible vesicovagin fistulas

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CELLULITIS OF THE NECK REQUIRING TRACHEOTOMY

GORDON B NEW, MD FACS, Rochester, Minnesota

rule, produce sufficient obstruction of the upper part of the respiratory tract to require tracheotomy, but I am reporting genes in which this was necessary in the last to vears. In 3 of these cases the potients had a diffuse cellulus and this roudits following infection of the upper part of the respiratory tract, in I case the patient had evolphilaline gouter, thy roudits and an absess of one lobe and the ist must off the through gland and in I patient a diffuse cellulus of the buttocks, a spreading cellulus of the buttocks, a spreading cellulus of the formed formed formed formed.

Patients who have infections of the neck are treated with large hot, most dressings which should be changed even hour If inflammation is present in the mouth or throat, hot tringations also are used. If the patient is unable to take sufficient fluids by mouth because of swelling of the pharvax a Rehfuss tube is passed through the nose into the stomach. If edema of the laryax occurs steam inhalations are used and in cases in which it is indicated an oxygen tent is employed.

Irradiation is of definite value in the treatment of certain infections of the neck. The parotitis associated with upper abdominal operations is greatly benefited and is sometimes cleared up five use of radium packs if used immediately after the onset of the infection. Certain diffuse board like infections of the neck have been entirely cleared up without drainage by the use of x ray therapy.

Drainage of the phlegmon is performed by means of intravenous administration of pentothal sodium, except in cases in which there is partial obstruction of the respiratory tract, in such cases, a spray of ethyl chloride is employed. Anesthetizing a patient for drainage of a phlegmon of the neck when the upper portion of the respiratory tract is partially obstructed may cause complete obstruction and necessitate an emergency trache otomy. A small measion is made in the skin over the point where the phlegmon is becoming local ized and a curved hemostat is passed into the pocket and spread. A fairly stiff eigerette design of the post of the point where the phlegmon is becoming local.

From the Section on Lary mology Oral and Plastic Sur ever The Mayo Claus. Read before the meeting of the American Laryhological Association. Atlantic City New Jersey. May 31 June 1 and 2, 1937.

age tube, o 75 centimeter in diameter, is inserted and sutured to the skin with silk (Fig. 11)

REPORT OF CASES

Case I. The patient was a butcher, aged 47 years. His general beath had been excellent previous to the onest of swelling of the neck and difficulty in swallowing and breath ing. There weeks before the patient came to The Mayo Clinic he had noticed a tickling sensation in his threat rad later had had a over threat. Two weeks later he had no ticed a swelling of the right ide of the neck which had gradually increased in use and extent. He had some first he had been able to swallow but little in the last few days before he exime to the china and he had had dyspeca or

certism file was greatly bothered by mucus is his threat. Erammation disclosed a duffus har declibits of the right isde of the neck which was preading across the mid inte (Fig. 1). There was not further than the right isde of the pharynt and largus on the right isde. The partiest was hopefulated his interpretative was run decreased in the partiest was hopefulated in the interpretative was run decreased and the was in the hop pital. General examination did not disclose any other abnormally an instructed into his 4-tomach for the administration of had large hot directions; we read explicitly a fine of the case of the parties of th

At the time of the tracheolomy a diffuse colladius of the rock had eliminated the landmarks uch as the broad foot the largust and the threat had not been and the threat and traches a tree found diplated of pursued to the large and the large of the second and the track of the second to the wound from the right side. This was packed and the cronoul carallage was elevated with a host so that the systems of the thyroid gland could be drieded. There was a duffuse cellulars. The trackes was opered above the second trached large 1 wanning industry the second trached large 1 wanning industry the most of the second trached large 1 wanning that the was presented as the part of the second trached large 1 wanning in the was also provided as the second trached large 1 was interested and the was also pasted with or great was interested and the was also pasted with or great was interested and the was also pasted with or great was interested and the was also pasted with or great was interested and the was also pasted with or great was interested and the was also pasted with or great was also pasted with the was also pas

The patent continued to be traininal for z days bugies rate and temperature however gradually decreased (Fig. 3). On the eventh day, after the trachestory a phigingum was drained on the right in of the right as about 3 outset continuenters) of pur was accounted and a rubber caparatte draining tube about 0.3 occubineters in diameter was inverted. Viar days followers the trachestomy, the edems of the large-state in the result of the continuenters in diameter was inverted. Viar days followers the trachestomy, the edems of the large-state in the result of the results of the

Case 2 A school teacher a woman aged 24 years, had been well until 2 weeks before the came to the climic when she had noticed some lacrimation of her eyes which had

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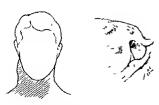


Fig 1 Diagrammatic drawing showing diffuse cellulities of the neck and edema of the largue in Case 1

cleared up on the third day. The next day she had ached alto ver and had felt has sit he had 'flue', she had gone to bed Fixe days before she came to the clinic she had noticed seeding and sorress of the throat and difficulty in small lowing. Four days later her throat had felt better but the neck had continued to swell and the patient had noticed difficulty in breathing and swallowing, and a collection of mucus in her throat.

Framination revealed edems of the epiglottis hypopharyng and arytenoid region grade 2 on a basis of 4 a diffuse inflammatory induration over the lower anterior portion of the neck in the region of the thyroid gland and tenderness which was most pronounced just to the right of the midline Diffuse cellulitis and thy roiditis were present but there was no fluctuation. Her temperature was 102 degrees F and her pulse rate was 110 beats per minute (Fig 4) General examination did not disclose any other abnormality. The patient was hospitalized hot dressings were applied over the neck and steam inhalations were The first night due to the increased edema and difficulty in breathing a tracheotoms was done in the pa tient's room to further drainage of the phiegmon of the neck was instituted but some pus drained into the wound The temperature gradually went down and was normal on the sixth postoperative day convalescence was uneventful

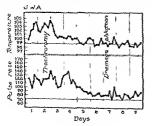
Case 3 The patient was a farmer aged 40 years Three weeks before he came to the clinic he had noticed a soreness in the neck while he had been threshing. He had stayed at



I ig 2 Bilateral diffuse cellulitis of the neck Rehiuss nasal feeding tube tracheotomy tube to the left of the midline and cigarette drainage tube below this

home for s or 3 days and then had resumed work. The soreness had continued and the patient had gone to an osteopath for treatment. Four days before he came to the climic he had been forced to go to bed on account of the suelling and sorress of the neck and he had used cold applications. He had had some dyspinata and some dysphagas since that time

L'ammation showed diffuse ceilluitis of the neck, which was more marked on the right side and a diffuse thy rouditis (Fig. 3). The patient entered the hospital during the night list temperature was roz. § digrees F. and his puble rate was it to beats per minute (Fig. 6). The next morning it was necessary to do an envergency trachectomy because of the increased dyspines secondary to the swelling of the neck marked buiging of the lateral wall of the pharynw and larynx and edems of the epiglotius and larynx on the right side. At the time of the trachectomy there were no land marks usable. Undiffuse the more marked and the trachest was should displaced to the left and was located with difficulty. While we were attempting to find the trachest was mall amount of pus seeped into the wound from



lig 3 Temperature chart in Case 1

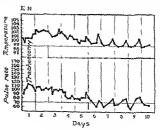


Fig 4 Temperature chart in Case 2



Fig. 5. Diagrammatic drawing showing the diffuse cellulities of the neck and edema of the larvax in Case 3.

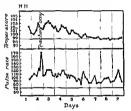


Fig. 6 Temperature chart in Case 3

the right side. At that time the patient had stopped breathing for a minute side he was cyanosed when the traches was opened. Breathing was resumed and the cyanosis disspacerad as a result of artificial resporation and the administration of oxygen. A curved forceps was passed into the right side of the wound where the puls had seeped in and a small drainage tube o 3 certified in the side of the form gauze and the patient placed in an oxygen tent for several hours. Uthough he was very ill for z or 3 days his temperature gradually subsided and his general condition improved. His temperature was normal on the tenth post operative day.

CASE 4. The patient was a stenographer a woman aged 32 years. Two and a half weeks before she came to the clame she had become all with swelling of the left antenor portion of the neck a high feer and chaffs. She had been treated with see pack. At that time the seek had been out onto the neck (Fig. 7). Examination at the clime disclosed that the patient had lost to pounds (4, 5 kilograms). She had no appetite. She had do spine a grade 2 on a basis of 4 and there was a drawing sinus in front of the neck which communicated with the left jobe and the salmust of the through the through the through the shade of the through the shade of the

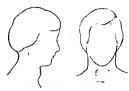


Fig 7 Diffuse thy rouditis and cellulatis of the neck in

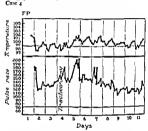


Fig. 8 Temperature chart in Case 4.

nosis of exophthalmic goiter and an absects of the left lobe and the isthmus of the thy roid gland

Examination of the laryive showed very little novement of ether vecal cord swelling in the left subplicture report and left traches and marked respiratory obstruction. There was considerable defined to the left sade of the third A curved forceps was passed into the draming miss in patient obstance some relief and was kept in the convenience of the conve

Cver. 5. Avenum aged 60 years had undergont a whototal abdominal hysterections and biaterial slain ocophorectomy for a cyet adenocarcinoma grade 2. Tao days after the operation a bullous yedems of the butted. It veloped and spread reports. It appeared has held held parent repon and following that the right porticit green nas in fected. Radium treatment was used and fluids were green intravenously. Blood cultures were negative. The bebing of the infection continued into the cycle were included. (Fig. 9). The patient was placed in an overa tent.

Examination 4 days after operation disclosed that the hypopharynx and laryngeal mucous membranes were

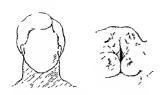


Fig 0 Diagrammatic drawing showing bilateral diffuse cellulities of the neck and parotid regions and laryngeal edema in Case 5

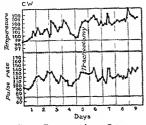


Fig to Temperature chart in Case 5

markedly edematous. The vocal cords could not be seen because of the edema of the lateral walls of the laryn. The edematous nucous membrane has sucked together during respiration of at the time of this retainmation of they was marked obstruction of respiration and a tube was placed in the trachea through the mouth following this, a trache county was done in the patient's from Reentgenologic examination of the thorax revealed bronchial pneumonia. The patient was returned to the oxygen tent her condition became gradually worse (Fig. 10) and she died 11 days following the operation.

This group of cases of cellulitis of the neck in which trachectomy was required emphasizes the well known fact that trachectomy should always be performed early whether the cause of the respiratory obstruction is infection or neoplasm Many patients who have cellulitis of the neck have some edema of the pharynx and larynx, but drainage of the phlegmon usually causes the



Fig 12 Philegmon of the right cervical region showing cigarette drainage tube in place

edema to subside However, in the case in which the edema is progressive and there is no fluctuation in the neck to suggest where the diffuse cellulitis is localizing, an early tracheotomy is advisable. In the cases reported, tracheotomy had to be performed through the diffuse cellulitis but it did not produce any exacerbation of the infection as it is sometimes believed to do. The wounds were packed wide open with iodoform gauze to permit drainage. The diffuse cellulitis cleared up promptly following the tracheotomy and drainage of the phlegmons. The patient who had exophthalmic goiter and the abscess of the thyroid gland did not recover so rapidly, because of the extent and the diffuse character of the abscess The patient who had undergone a hysterectomy was so acutely ill with a severe generalized infectron and bronchopneumonia that the cellulitis of the neck was only an additional complication, and it appears that the patient would have died regardless of this In diffuse cellulitis of the neck without localization and with increasing upper respiratory obstruction, tracheotomy should be performed early

TOTAL GASTRIC RESECTION

An Experimental Study

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N an effort to overcome some of the difficulties and unastisfactory results encountered in total gastic resections, a new operation has been devised and practiced on dogs. A brief description of the procedure and of the results obtained with it experimentally will be found in the following pages

The operation is performed in two stages sepa

rated by an interval of 2 or 3 weeks

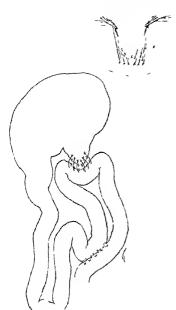
The first stage The abdominal cavity is entered through an upper midline incision and the omen tum is reflected to the left upper quadrant. The optimal exposure of the operative region is obtained by a three fold manipulation of the stomach carried out in the following manner (1) it is drawn down to place tension on the esophagus (2) its fundus is rotated to the right to expose the esophageal hiatus and the structures lying directly behind the stomach and below the diaphragm and (3) it is drawn forward to bring into view the muscles which form the posterior portion of the esophageal hiatus. When completed these manipulations disclose an area which contains no structures lying between the mesen teric vessels where they branch off of the large vessels posteriorly and the lowermost portion of the mediastinum. The peritoneum in this area is incised and the aperture enlarged to 2 or 3 cents meters in length Through this opening the mediastinum is dissected off of the esophagus which lies directly anterior to it. Care must be exercised during this procedure to avoid opening the mediastinum. A tape is now placed in the aperture to hold the esophagus forward and this region is temporarily abandoned until the optimal intestinal loop for the anastomosis has been selected. A segment of jejunum beginning about 15 to 20 centimeters below Treitz s hgament has been found best for this purpose. It must be sufficiently long and free to reach to the level of the draphragm and pass through the aperture just described, without undue tension A trial may be made to ascertain which loop of bowel best lends itself to this displacement. The selection made 6 silk sutures are placed at 1/2 centimater intervals and lengthwise of the intestine,

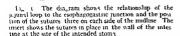
into the segment of jejunum midway between its mesenteric attachment and the opposite free side ie, at a distance from the mesentery of about one quarter of the total circumference of the intestine. The straight needles used to introduce these sutures are now discarded. Unthreaded the three sutures nearest the stomach are carried through the aperture and with them the portion of jejunum through which they run (Fig. 1) This brings the proximal half of the loop to the point where esophagus and diaphragm meet to the right of the midline. The other half of the loop with the other three sutures remains on the left of the midline at the same level (Fig 2) The sutures are now threaded onto curved needles and passed through the crural fibers of the diaphragm and the posterior wall of the esophagus (Fig 3) Each suture is tied separately and at the end of the procedure a firm union has been obtained be tween the draphragm, the ecophagus just proximal to the gastro-esophageal junction, and the duo denum The greater part of the posterior half of the esophageal wall is included in this union

The loop of jejunum displaced in this way is exposed to danger of obstruction by acute angula tion or by pressure upon it by the storach star safety measure therefore an entero-enterostom is made between the provinal and distal limbs of the jejunum at a point where these two segments naturally approach each other. This point is usually a few centimeters distal to Treitz s ligar ment. The method originally described by Halsted is employed for the lateral anastomoris. Following this procedure, the abdomen is closed and the dog is permitted to recover from operation. He is fed the usual cannie duct for 2 or 3 weeks when he is subjected to the second stage operation.

The second stage consists in the gastic resction and the completion of the anastomosis of esopha gus and jejunum. The abdominal cavity is entered through the original wound and the omen time is again reflected to the left upper quadrant. With the stomach exposed from the daphingm to the duodenum, the vessels first of the greater and then off the lesser curvature are ligated and cut. The stomach is resected at its junction with the duodenum and the duodental stump is closed.

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and inverted. With the free pylonic end of the stomach drawn outward and forward the site of the first operation and of the point of union be tween esophigus and jepunum and disphragm comes into view. Two Kocher clamps are placed across the esophagus above but close to the gastroesophageal junction and the stomach is resected between these clamps, the actual cautery or the phenol alcohol technique being employed in the transaction (Fig. 4). With the stomach removed, the anastomosis of jejunum and esophagus may be completed, it is carried our according to the



Un z Three of the sutures previously placed in the intestinal wall have been passed through the aperture directly posterior to the esophagogastric junction carrying with them the segment of jejunum



Fig. 3. The sutures have been threaded onto curved needles and are passed through the crural fibers of the diaphrigm and posterior wall of the esophagus

Halsted method, the line of sutures placed in esophagus, jejunum, and diaphragm at the first

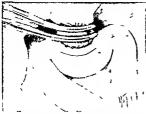


Fig. 4. With the stomach free up to the exophagogastre junction two Kocher clamps have been placed across the e-ophagus just distal to the suture line established at the first operation. The stomach will be reserted between these two clamps.



Fig. 4 The anastomosis is shown nearing completion. The mattress sutures in the anterior wall of the anastomosis are in place the continuous attree placed through the wall of jegunum and esophagus to form the inner aspect of the posterior wall of the anastomosis can be seen.

operation forming the posterior wall of the anastomosis. To facilitate exposure and to hold jeju



Fig. 6 The mattress sutures have been ted and the reinforcing vulures have been placed between them. The duodenal stump has been inverted and secured to the personneum of the posterior abdominal will. The enter-enterostomy established in the first state operation can be seen

num and ecophagus in alinement traction sutures are introduced, one at either end of the line of union Traction on them brings the structures forward, and in this position mattress sutures are placed about o 5 centimeter apart and extending the full length of the intended stoma In introducing these sutures it must be borne in mind that they are to unite the jejunum and esophagus to form the anterior wall of the anastomosis, therefore, they must encompass an area sufficiently large to allow the stoma to be made, when tied they should bring the two structures together at a distance of about 1 centimeter from the poste nor suture line already present. The row of sutures completed they must be separated so that the opening in the jejunum may be made To do this, a clamp is inserted between the central mattress sutures and passed to the end of the line under this half of them where it is made to grasp the traction suture and to draw it through



Fig 7 Roentgenogram showing barium visualization of the anastomosis

under the mattress sutures to the center. The same maneuver is carried out on the other side and the mattress sutures are separated and reflected to either side by pulling on the traction sutures The jejunal wall is now incised parallel to and o 5 centimeter from the posterior suture line introduced in the first stage operation Bleeding vessels are caught and ligated with plain catgut (No oo) as soon as the opening is made The clamp on the esophageal stump is removed, the material which escapes is withdrawn by suction, and the vessels are clamped and tied. A continuous lock statch of plain catgut (No o) is now carried around the posterior aspect of the stoma through the entire wall of jejunum and esophagus, joining them to form the inner side of the postenor wall of the anastomosis When all bleeding from esophageal and intestinal surfaces has been controlled, the mattress sutures are drawn up (Fig 5), while the anterior walls of the two structures are being approximated in this manner, the mucosa is carefully inverted. Each suture is tied separately and fine silk sutures are placed between them to reinforce the closure

The anastomosis completed, attention is direct ed to the duodenal stump, it is sutured to the peritoneum of the posterior abdominal wall with



Fig 8 Photograph of specimen removed from a dog 3 months after the second operation. The esophagus and intestine have been injected with formalin.

a few interrupted stitches. The abdomen is closed without drainage

RESULTS OF THE OPERATION IN EXPERI-MENTAL ANIMALS

Twelve animals have been subjected to the procedure described The first 3 dogs died of pentonius and due to the following causes, in the first, postmortem examination revealed a defective suture line in the anastomosis with necrosis in the wall of the esophagus. The second showed tearing of the intestine by the sutures, the third exhibited no traces of defect in the anastomosis All 3 dogs died within 5 days of the second stage operation. A fourth animal died of distemper 6 days after the first operation autops; showed the loop of jejunum properly secured and firmly attached to the diaphragm and esophagus, the entero-enterostomy appeared to be functioning satisfactorily as the loop of jejunum was not distended Dogs 5 and 6 were carried through both stages of the procedure successfully and lived for 3 months after the second stage, at the end of this time they were sacrificed in order to obtain specimens for study Both of these dogs showed rather marked anemia. though blood studies were not made to corrobo rate this impression Animal 7 lived 21 days after the second operation Autops; failed to show the cause of death and it was believed that the fatal outcome in this dog was due to the marked anemia which again was present. Animal 8 died as the result of the anesthetic during the second stage operation Dog o was in good general condition 30 days after the second operation A roent genographic evamination at this time showed marked narrowing of the intestinal lumen at the site of the anastomosis and dilatation of the esophagus above this point (Fig. 7) The dog was sacrificed to obtain the specimen Grossly the lumen of the intestine at the point where the constriction was evident in v ray film was not smaller than elsewhere The amount of scar tissue at this point was negligible. It was believed that the narrowing of the lumen seen in the v ray picture was due to spasm Animal 10 was sacrificed 60 days after the second stage operation His condition at this time was not good he was not eating well and was markedly anemic Animals 11 and 12 were sacrificed 2 months after the second operation. Both were in fair condition generally and anemia was not marked (Fig. 8 dog 12) SUMMARY

The cause of death in the first 3 dogs was indisputably peritonitis. The peritoneal infection was believed to be the result of faulty closure of the anastomosis at the time of operation. The

experience in these 3 animals brought several important details in the procedure to our attention, it emphasized the need of meticulous care in the construction of the anastomosis. It was realized that to the usual difficulties encountered in obtaining a union between two segments of the gastrointestinal tract, another was added -that of the motion of respiration to which the parts involved in this union are subjected. Also the wall of the esophagus lends itself less well to su turing than other portions of the alimentary tract The first layer of sutures, or, the foundation for the posterior wall of the anastomosis is construct ed during the first stage operation when intestine, diaphragm, and esophagus are united. This union is secure at the time of the second operation and is further reinforced by a continuous lock stitch placed through the entire wall of jejunum and esophagus after the stoma has been made. The anterior wall of the anastomosis however, must be constructed entirely during the second stage operation therefore, meticulous care must be exercised in uniting the walls of jejunum and esophagus anteriorly The mattress sutures alone cannot be depended upon to make the closure secure they must be reinforced with interrupted silk sutures The material employed should be of small caliber and the sutures should pass through the muscularis only and not through the muco-al layer of the organs Also, the sutures must not be tied too tight, blanching of the wall of the esopha gus indicates that the tension on the sutures as tied, is too great

The anemia which many of the dogs exhibited, has not been studied nor has the cause of the

anemia been determined

EXPERIENCES OF A BLOOD TRANSFUSION TEAM

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HORTLY after Passavant Memoral Hospital opened in June, 1929, it was appreciated that a permanent team was desirable to obtain efficient blood transfusions with maximum safety. This was the first and, so far as is known, the only hospital in the Chicago metropolitan area to organize a transfusion team, and all but a dozen odd transfusions have been given by it. As experience has accumulated, improvements in the technique have made it possible for succeeding transfusions to be given on shorter notice, more safely, and with less discomfort to hoth patient and donor.

The team consists of a chief (the surgical fellow) together with the surgical residents. When a transfusion is desired, the attending physician informs his interne, who then consults with one of the team as to a desirable time to do the transfusion. The interne collects cells and serum for typing and cross matching from the patient and the prospective donors. This typing is conducted by the technicians in the hospital's chinical laboratory, except during the night and on week ends, and then it hecomes the responsibility of the

transfusion chief

Rouinely the hanging drop technique is used, and in only a very occasional case does the itter of one of the blood samples make the typing questionable. In such a case another donor is sought. The hanging drop is allowed to stand one hour at room temperature before being read, unless there is need of unusual speed in giving the transfusion. In such a case several things may be done. The typing may be speeded by placing the slide in an incubator at 37 degrees C for 20 minutes, or, upon being set up, it may be agitated between the fingers for 3 minutes and then read if agglutnation is going to occur, it will be grossly evident within this time. Cross matching is in variably done.

A blood Wassermann test is required on all donors, and emergency kahn tests may be obtained in an hour's time between the hours of 9 oo am and 3 oo pm. An adequate list of professional donors of all types, who have had recent Wassermann tests, is kept on file. A large majority of these men attend the medical school and.

therefore, live in the neighborhood To facilitate paying them promptly, a transfusion fund has been set up by charging \$50 for 500 cubic cen timeters of blood and setting aside \$10 before paying \$40 to the donor Impoverished patients needing professional donors utilize this fund, as do professional donors who stand by but are not used, the latter being paid &s for waiting Turthermore, professional donors for non charity patients are immediately paid from the fund rather than being required to wait until the patient settles his bill There is never occasion, regardless of the emergency, to utilize a donor whose Wassermann or Kahn has not been tested. since it is the policy in such a case to pay for a professional donor out of the fund rather than take the chance of using a syphilitic donor

From the time the hospital opened in June, 1929, to January, 1936, a total of 306 patients were given 525 transfusions, an average of 1 7 per

patient

During the first year, the Scannell method was used almost entirely. It was gradually replaced by the citrate method, first, as described by Lewisohn, and, more recently, as a closed system t The multiple syringe method has been used twice, and re-infusion of blood collected at the operation has been done twice. The Lewisohn citrate apparatus consisted essentially of a sterile graduate, placed lower than the donor's arm, into which sodium citrate was poured while the blood was allowed to flow in A glass stirring rod was used For the recipient this blood was filtered through gauze and delivered through a salvarsan apparatus With sterile operating room technique and an assistant, it usually took an hour and a half (depending upon the rate of flow into the recipient) to give a transfusion. The currently used closed citrate system permits much greater convenience and speed and an assistant is not required Usually within to minutes from the time a donor presents himself the blood is flowing into the patient's vein. On one occasion when two operative patients went into shock at the same time both had their transfusions under way within 20 minutes

It is necessary only occasionally, perhaps once in fifty times, to cut down on a vein on either donor or recipient since small needles, Nos 16,

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TABLE I -TYPES OF PATIENTS

Type (Moss)		Memorial Hospital	Moss e
iv	(O) (A)	48 x	43
11	(A)	37 8	40
III	(B)	11 7	7
1	(AB)	2 4	10

18 or 30, are used However, should thus be necessary, a fully equipped vein cannulating tray is always available. Experience has shown that a very small median hassile or cultural vein may be enlarged to a satisfactory degree by tapping the vein hiskly or placing the arm in warm water. Many times the suphenous at the ankle can be punctured without satisfacing it, and it can always be cannulated. Rarely the jugular has been employed when all other veins have been either thrombosed or ligated, and in male patients the corpus cavernosum is always available for puncture. This is a harmless procedure and efficient if care is taken not to injure the dorsal artery or the utethra.

An analysis of the types of patients transfused indicates that these 306 correspond quite closely with the figures given as a normal proportion of types by Moss (Table I). Not included were 22 patients whose type was not determined since only cross matching was done in those first few months in 1939 before the transfusion team could be organized. It was not possible to associate certain diseases with special blood types. For in stince, there was no undue preponderance of carcinoma or any of the blood dyscrasias in a particular blood group.

A word about the effect of transfusion on donors is not out of place. The largest quantity taken at one time from one man was ooo cubic centimeters and this was without undue effect on him Now and then a donor faints during a transfusion or on regaining his feet if he gets up too soon, and often as not this accident involves the huskier type of person The routine precaution consists in having him remain prone for 15 minutes, then giving him a full glass of milk, water, or other hand Most donors feel weak for 24 hours Within a few hours they have regained their circulating find balance. after 3 weeks they have regained their red cells, and, if they have given many transfusions, their red count regains an ahnormally high level. This repeated depletion of red cells stimulates the hemopoietic system to compensate hy over production

One of the most important things to look into in reviewing a series of blood transfusions is not the technique of the procedure (because that may

TABLE II -- CORRELATION OF INDICATIONS AND RESULTS IN TRANSFUSIONS

Total		Results	
	Indications	Im proved	Laumproned or died
3	Purpurs hemorrhagica hemophilia perm sous anemia	3	
80	Acute bemarrhage or shock	70	10
55	Marked secondary anemia due to chroase hemorrhage pre-operative major surgery and postoperative general support	49	6
38	Jaundice (for hemostasis)	24	4
\$6	Septic fever or a nemia due to infection	25	14
•	Provide hemoglobia in pneumonia	5	4
35	Perstantis or postoperative ileus	18	20
31	General support for debility profound tourning enchange of cancer uremis	10	a:
30	E-eucemiska	3	7
4	Splenic spemis		- 3
5	Agranulotytic angina	ī	- 4
1	Hodgkin s disease	•	1
,	Septicemia (positive blood culture)	•	7_
32	In est emis other than due to shock of hemorrhage		31
3	Not evident	•	

vary with the expenence of the operator, and with local condutons but rather the indications for which transfusion is done. Table III has been compled to correlate indications with results. In this table those transfusions followed by the most satisfactor, results are histed first and, in order, those achieving less and less benefit, until at the bottom one sees that there were 32 cases of patients in extremit, not due to shook or hemorrhap, in which transfusion was ordered as something to do as a last resort. None of this latter group was heliced.

Figures indicate the number of patients transfused—not the number of transfusions given as mad all patients were presumably given as many as thought indicated to achieve a good result

It is evident that tran-fusion is pecific for acute hemorrhage and shock. Because in 10 cases in 80 the patents were not improved as no reflection upon the treatment. Those patents were all past any possible hope of recovery. In marked secondary anemas due to chronic hemorrhage the modence of definite improvement following transfusions was greater than in those transitions does rescondary anemas with infection, yet even in the latter category two-thirds of the patients were helped. Adequate pre operative preparation by

transfusion of jaundiced patients having common duct obstruction due either to stone or carcinoma was clearly valuable. Only 4 of 28 such cases bled after operation, and that is in marked con trast to the high proportion of hemorrhages that have occurred in the years before transfusions were done before operation in jaundiced patients Transfusion was of moderate value in peritonitis and postoperative ileus. One-third of a group of profoundly toyemic and cachectic or debilitated patients was improved-a fair record for any kind of therapy against such odds. In contrast, transfusion was of questionable value for the leucemias, and probably of little value in splenic anemia, Hodgkin's disease, and agranulocytic angina None of the 7 patients with septicemia (proved by positive blood cultures) was in any way aided The experience of others as reported in the literature is about the same 1 In contrast to these, one case each of purpura hemorrhagica, hemophilia, and pernicious anemia was clearly benefited Trans fusions given to add hemoglobin to anovemic pneumonia patients were frequently worth while in that, when given in association with oxigen therapy, a marked and prompt fall in respiration and pulse rates, and even temperature, occurred almost as a rule In general, from Table II, it is seen that about one third of the patients received no appreciable benefit from transfusion Perhaps a more rigid adherence to the proper indications for giving them would lower this figure

Allowing for time to correct the water balance, an average gain of about 350,000 red cells may be expected from a 500 cubic centimeter transfusion Estimates on the life of these red cells vary with different investigators between 2 weeks and 3 months, the work being made more difficult because some of the cells at any given time have reached the end of their normal life period while others are just beginning. One method of approach to this problem consists in transfusing type IV (Moss, or type O Landsteiner) cells into an experimental patient of another type and at intervals agglutinating blood samples with type IV serum, then making blood counts on the nonagglutinated cells

As would be expected, the prognosis in cases in which patients require multiple transfusions becomes worse roughly in proportion to the number of these transfusions, since the sicker the patient is the more transfusions he may need (Table III)

	TABLE III	
Cases.	Transfusions each	Improved o
	1	62
<8	2	50
196 58 20	3	40
7	4	86
4	5	50
3	6	3333
2	7	0
3	8	0
ĭ	13	0

A study of reactions shows that they became progressively less and less frequent from year to year There were 35 per cent reactions in the last 100 cases, whereas the average for the whole time was 16 7 per cent Rather rigid criteria were em-

ployed in defining a reaction

The most frequent kind, a slight chill and pulse elevation of at least 15 points, with or without fever, usually coming on one half hour after transfusion and persisting about three quarters of an hour, occurred 52 times A violent reaction of the same kind with a temperature of over 13/2 degrees occurred 12 times A delayed reaction, by which is meant a chill and 13/2 degrees of fever coming on more than 12 hours later, occurred twice Ur ticaria, with or without a chill, usually coming on immediately after a transfusion and lasting from 1 to 2 hours, appeared 6 times Headache, nausea, vomiting, and abdominal cramps, coming on during the transfusion, occurred 4 times Hemoptysis, dyspnea, and cyanosis, appearing during or immediately after the transfusion, occurred 5 times. In 2 patients the transfusion was followed by congestive heart failure, and death occurred in 6

A 38 year old noman with a liver abscess was trans fused because of a secondary anemia of 3 400 000 Her type was III, and 500 cubic centimeters of type IV (Moss) donor blood resulted in a prompt severe cyanosis and was followed by death in 2 hours

2 A 40 year old woman, with blood pressure 198/138, an ablatio placente having 2 300 000 type IV cells nas treated for acute hemorrhage with 500 cubic centimeters of type IV blood given by the Scanrell method in 27 minutes. When 300 cubic centimeters had been given the pulse was 80 when 500 cubic centimeters was given it was irregular, and 20 minutes later she was dead

3 A 20 year old girl with agranulocytic angina of 12 hours' duration, having a white count of 600 and no poly morphonuclears was transfused without incident or bene The next day transfusion was repeated 300 cubic centimeters of citrated blood being given in 13 minutes at which time marked dyspnea appeared the patient went into circulators collapse, becoming cold blue, and almost pulseless and death followed shortly

4 A 13 year old girl, profoundly septic, with an acute mastorditis and streptococcus meningitis, was given 350 cubic centimeters of blood in 20 minutes by the multiple syringe method and the transfusion was stopped because of sudden cardiac irregularity Death followed in 5 hours

[&]quot;In fact Lewisohn states (J Am 31 Ass 2023 So 248). The most formidable chills were encountered when treating leacemia and acute separs. Experience has shown that in leucemia as well as in acute separs transfusion is useless as a therapeutic measure and sometimes causes grave danger to the patient. For this reason blood transfusion is strictly contra indicated in these conditions.

5 A 76 year old man submitted to a transurethral productetomy and was transfused after operation because of anemia and a blood pressure of 90/70. During the transfu ion of 500 cubic centimeters of citrated blood given over an unknown period of time there occurred sudder cheet pain dyspices and cyanosis. Fullmonary thrombosis was found open to the first production of the production of the

6 A 38 year old housewife existerating after hysterectomy was repaired and then transfused during one half hour with 500 cubic centimeters of citrated blood. An hour later she became cyanosed pulse was imperceptible and

death promptly followed.

There are several unsettled points as to the tenlogy of these reactions. From the standpoint of technique the Scannell whole blood method was used 71 times and there were 36 per cent reactions. The citrate method was used 451 times with only 13 8 per cent reactions. The multiple syninge method was used twice, and a reaction occurred once. Re infusion of blood collected at operation was done twice with no reaction resulting.

In considering the role of blood groups in the etiology of reactions, there were found of cases of types II III, and I recipients who were given blood from type IV so called universal, donors 4 reactions occurred. These universal donors were used as such during the earliest days of transfusion team, before a card catalogue of donors was available. Since then, type IV donors have not been used for other than type IV patients. It has been said that more reactions are hiely in type II because of the Irequency of sub groups in that type and that it is safer to use type IV than type II donors for those cases. Our records do not substantiate this view. Upon analy ang the reactions we found

Type IV responsible for 39 per cent of the reactions Type III responsible for 34 per cent of the reactions Type III responsible for 12 per cent of the reactions Type I responsible for 7 per cent of the reactions Types not grouped responsible for 8 per cent of the re

This is approximately the proportion of the group-

ing seen in the total cases

The time element in giving transfusions is often held to be an important factor in the production of reactions. Records are not complete on the time interval of all transfusions given, but I cases having reactions and so not having reactions have been analyzed. In the 50 cases with reaction.

Donor—average time 13 5 minutes maximum time 75 minutes minimum time 5 minutes

Recipient—average time 21 7 minutes maximum time 50 minutes minimum time 6 minutes In 50 cases without reaction

Donor-average time 9.4 minutes maximum time 40 minutes minimum time 2 minutes

Recipient—average time 42 5 minutes maximum time 2-0 minutes minimum time 0 minutes

In the transfusions not associated with reactions the donor time was definitely shorter and the recipient's time was nearly twice as long as in the contrasting group having reactions. Although there is no clear evidence that a rapidly given transfusion adds to the frequency of the ordinarichill and fener type of reaction—it does tend to crowd the right heart. Several of the 6 deaths here reviewed were a sociated with a rapidly given transfusion and were followed by circulatory failure. In addition, there were z cases in which patients developed prompt congestive heart fail ure and fived. In these, the transfusions took 13

and 20 minutes, respectively

In looking further into the cause of reactions, since in all but I of these cases proper cross matching was done, it seems likely that sterile but chemically unclean apparatus may account for most of the cares developing moderate chills and This last year, since using only distilled water to clean both transfusion and intravenous sets, chills and fever have become a rare occur rence No doubt the high incidence of reactions in using the Scannell apparatus was due to the difficulty in cleaning this relatively complicated mechanism Protein sensitivity must account for many of the reactions characterized by headache, nausea, comiting, and urticana! Hemopty's dyspnea, and cvanosis, usually coming on during the transfusion seem most likely the manifesta tions of multiple small emboli or, as was proved in I case, a large pulmonary embolus. These usually occurred in elderly people

In several cases coming to postmortemeranina tion the pathologist on finding deposits of hemosiderin in the glomeruli has asked if the patient had had a recent transfusion. In an effort to associate reactions with renal pathology, 40 cases having a negative urine sediment before transision were followed for several days with check urines. In many of these a small amount of albumin, hyaline, and granular casts appeared

Quoting Vauchan and Fires. 'On the Probabe Frequency of Univer-Shock in the American Journal of Decimic Discost and apply 3 No. 5 Oct. The respective size along the Control of enga about a hours before translation. When recent the expecting about a hours before translation. When recent the expection of the Control of and persisted for from 2 to 8 days, but they were not found any more frequently in those patients who had reactions than in those who did not have them

The more common type of reactions with chills and fever are best treated prophylactically by using clean apparatus. The clots and blood in a recently used transfusion set are immediately washed out with double distilled water under pressure rather than using tap water. Since this has been carefully done this type of reaction has become relatively rare-much less frequent in fact than is shown by the figures in this study which extend only up to the beginning of 1936 Actual treatment consists only in supplying adequate blankets and hot water bottles and reassuring the patient that the discomfort is barmless and short lasting The itching of urticaria, by contrast, is most satisfactorily treated with adrenalin given as early as possible. That type of reaction characterized by beadache, nausea, vomiting, and cramps calls for immediate interruption of the transfusion, and, since a small amount of incompatible blood can cause it, the first 20 cubic centimeters should be given slowly Hemoptysis, dyspnea, and cyanosis should have the same type of treatment with the addition of ovegen If incompatible blood should have been given through error-a prompt transfusion with matched blood may be life saving

Several theses are offered—not to be taken as facts but rather as convictions arising from the experience of the transfusion team

r The matter of whether or not sodium citrate is injected intravenously plays no direct part in the etiology of reactions

2 Sodnim citrate in no way affects the bleeding or clotting time of the patient since enough catcium is always available to neutralize it. A citrate transfusion is as valuable for jaundiced patients.

as is whole blood

3 Blood given rapidly to a recipient does not increase the chances of reaction—exception cases of impending circulatory embarrassment should be protected by a slow transfusion. Most of our serious accidents occurred by minimizing this point.

4 A previous recent transfusion does not make more likely a reaction to a subsequent transfusion

from a different donor

5 Aside from not being definitely helped, leucemia, agranulocytic angina, subacute bacterial endocarditis, and splenic anemia cases suffer a high incidence of reactions

6 Patients in extrems not due to shock or hemorrhage should not be transfused. In 32 of these cases patients were transfused in spite of the fact that not one of them has ever been helped. It should be pointed out that as a gesture transfusions, besides often being expensive, are not free from danger to the patients if not deleterious to the donor, ie, 167 per cent of the patients had reactions. Ten of them were severe enough to require stopping the transfusion, 6 others ended fatally under circumstances which involved the transfusion as a major etiological factor.

EDITORIALS

SURGERY Gynecology and Obstetrics

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FRANKLIN H MARTIN M D
Founder and Managing Editor
1905-1935

ALLEN B KANAVEL, EDITOP

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SUMSER L KOCH MICHAEL L MASON

DONALD C BALFOUR Issociate Editorial Staff

OCTOBER 1937

ACUIE CHOLECISTITIS —

CYNIC once inquired, "Was life worth living" and received the captious reply, "It all depends on the liver'

All experimental animals with an Eck's fistula die of septicemia and the interposition of the liver between the alimentary system with its portal connections and the general arterial system indicates the primal importance of the liver in protecting the individual from systemic infection A continuous debate and many publications would seem to indicate that the question when to operate in acute cholecystitis is still undetermined. It has been demonstrated that, in acute infeetions of the gall hladder, there are varying degrees of pathological change in the common duct, pancreas, and liver, and recent papers on acute cholecystitis indicate that the gall hladder is either gangrenous or has per forated in over 20 per cent of the patients subjected to surgical intervention. It has

been held that the operative mortality in acute cholecy stitis is probabilitive and that this mortality may be lessened by a resting period of watchful waiting. It would seem that this thesis is based upon rather duhious premises When an acute infection starts in the gall bladder complicated, as it usually is, by the presence of foreign body-calculi-the path ological sequence is that of a progressive in flammatory invasion The viscus becomes infiltrated with poly morphonuclear and round cells, marked inflammatory edema ensues, pressure changes follow, and some degree of infection occurs in the lymphatics of the liver and pancreas All of these elements are cer tainly present

It would appear to be very definitely settled that there is no parallelism between the clinical symptoms of acute cholecystitis and the pathological damage present in the gali bladder Numerous authors bave observed that all too frequently chinical manifestations of the disease are subsiding while the gall bladder is progressing to empyema, gangrene, and perforation Zinninger reports 54 cases of acute cholecy stitis which were kept under observation from 1 to 12 days. In 37 per cent the attacks subsided, while in 35 per cent the attacks failed to subside after an interval of 12 days In 27 per cent the attacks not only failed to subside hut became progressively worse and four perforations of the gall bladder were found at operation It follows from these observations that a patient with an acute cholecystitis has one chance in three of having a resolution of the pathological process in the gall bladder

The early history of appendicatis was cloud ed by similar controversial discussions as to when and when not to operate For the physician to counsel waiting in acute disease is to participate in a surgical gamble that "under a regimen of starvation, local applications, an ascending phase of pathological change will become arrested." This is distinctly a gamble with the odds against him. The records of patients so treated show that while nature may "wall off" the gall bladder the primary and essential lesion is, in over 63 per cent of cases, a continuing process leading to grave surgical complications.

Few individuals will long withstand the disseminating effects of the retention of the products of infection under pressure and the technical indication for operation in acute cholecystitis is to institute drainage, so that the products of infection will not be retained under pressure, hence gangrene and perforation will be forestalled. Operation provides a means of overcoming the increasing peril of undrained infection. It is not necessary to advocate cholecystectomy or any one set form of operation. The indication is to operate carefully, with due celerity, relieve the mechanical obstruction, and provide drainage This may be done by a simple cholecystectomy, by marsupialization of the fundus of the gall bladder, or by splitting the gall bladder from the fundus to the cystic duct and enucleating the mucous membrane of the gall bladder, performing an intravesical cholecystectomy with drainage By any one of these procedures drainage is provided, yet the protective barrier around the gall bladder and particularly that protection interposed between the liver and the gall bladder is left undisturbed Few will countenance the classical cholecystectomy with the opening up of the large liver bed of the gall bladder fossa, thus exposing a relatively wide area to septic absorption and destroying the natural barrier of resistance that has been built up Most of the cases of acute cholecystitis are superimposed upon chronic cholecystitis and usually with the complicating factor of calculus Preventive medical thought and wise, judi cous surgery would suggest the early removal of the chronically infected gall bladder and not delay until the accident of infection initiates a fulminating acute cholecystitis. If infection is the primary and basic danger in acute gall-bladder disease then the continuation of the infection by a policy of "innocuous desuetude" is harmful and lethal and any properly collected series of cases will show a higher mortality with this policy than that which accompanies early surgical intervention.

Teachers of surgery who lend their prestige and give support to a policy of waiting provide authority for timid surgeons, inexperienced operators, and procrastinating practitioners Increasing statistics demonstrate forcibly that the operative mortality in patients who are operated upon in the early stage of acute cholecystitis is not greater than that which obtains in routine gall-bladder surgery Furthermore, the high mortality, of approximately 20 per cent that occurs after late operation is largely the mortality that arises from the complications-empyema, abscess, gangrene, and perforation-and, when and if operative recovery finally takes place, there remains the permanent damage to liver and associated organs with cootinued morbidity

CHARLES GORDON HEYD

GASTRO-INTESTINAL HEMORRHAGE

HE great variability in reports on the mortality from hemorrhage associated with ulcer is partly owing to the classification of the cases. It may be assumed, however, that in any case in which hospitalization is required for gastro-intestinal

hemorrhage, the hemorrhage can be looked on as at least moderately severe. In a recent article. Reschke stated that the mortality in a group of cases in which the hemorrhage was so classified was o 5 per cent and that among those cases in which the hemorrhage was considered to he severe, the mortality varied in different clinics from 17 to 27 per cent In the face of such statistics, the possibilities of surrical treatment of acute hemorrhage would seem to merit consideration. There is, how ever, not only the problem of selecting for operation those cases in which there would otherwise he a fatal outcome, but there is also the fact that reports from clinics other than that with which Reschke's report was con cerned do not indicate any such mortality as that reported by him among patients who are hospitalized because of gastro intestinal hem orrhage and who are treated non surgically One of the most interesting studies, for example has been that of Meulengracht who showed that the mortality among patients ad mitted to hospital and treated non surgically because of hemorrhage from ulcer is very much lower (4 1 per cent) than that reported from other clinics and also that an adequate intake of food, immediately instituted, re duced the mortality to 1 per cent in a series of approximately 300 cases Subsequent studies of Meulengracht's group of cases as compared with those in which routine treatment consisting of rest and abstinence from food was employed, have shown that the blood picture in his cases returned much more rapidly to normal

Further in support of the contention that hemorrhage from pepticuleer is not considered in actual percentage, often likely to result fatally, Hurst and Ryle have reported a mortality of 1 5 per cent attributable to hemorrhage from ulcer among patients encountered in general practice, and a mortality of 4 8 per

cent among patients with ulcer admitted to hospital because of hemorrhage

Hurst and Ryle have stated that there are three outstanding difficulties in the manage ment in severe cases "(1) the difficulty of giving a prognosis even when we know some thing of the nature, site, and size of the lesion, and can gauge the amount and continuance of the blood loss, (2) the difficulty of refraining from active interference hecause we possess this knowledge and hecause we are anxious. and (3) the difficulty in many instances of being sure whether there is a demonstrable ulcer present at all " It is probably this last difficulty that contributes so much confusion to both the prognosis and treatment of gastrointestinal hemorrhage. There is increasing evidence to substantiate the belief that the majority of hemorrhages which originate in the stomach and duodenum are not the result of excavating ulcers but rather of a diffuse hemorrhagic condition associated with either multiple, superficial ulcerations, or with an inflammator, process that is not attended by even these superficial erosions. Whether, in turn, this inflammators condition may be de pendent on food allergy, or deficiency of vita min C or a focus of infection is still to he es tablished, but there is much to suggest that many, and perhaps the majority, of these hemorrhages have some hasis other than chronic ulcer, and for this group of cases in which chronic ulcer is absent there are as yet no surgical indications

Of some aid in prognosis in the cases in which chromic ulcer is present is the degree of arterial change. Hesser has shown that the mortality among the younger patients is definitely lower than it is among those who are of the age in which some degree of arterial sclerosis is common. He cited his own figures which furnish striking evidence to support thus fact. In a group of 195 patients who were

less than 55 years of age there was no fatahty, and in a group of 109 patients who were more than 55 years of age there were 9 fatahties

The most significant cyidence of a possibly fatal outcome is a fresh, massive hemorrhage occurring while a patient is under treatment for hemorrhage, and it is then that operation can be justifiably considered even though it is not positively known that the patient has an ulcer Under such circumstances, a massive transfusion of blood, or a continuous transfusion over a period of several hours, should be given, together with the best surgical procedure which is possible Selection of this procedure is not necessarily made on the same basis as in the case of chronic ulcer, for the reason that the chief purpose of the operation is to avert death from bemorrhage. Theoretically, anything short of direct attack on the ulcer should not be considered effective surgery and therefore indirect operations in such cases should not be of much benefit To what extent complete exclusion of a lesion in which bleeding is taking place from an eroded vessel will contribute to satisfactory clotting is problematical, but it is significant that those who advocate partial gastrectomy for bleeding duodenal lesions during the time of bemorrhage are also advocates of the exclusion type of resection when excision of the lesion appears to be a too difficult and hazardous procedure If exclusion of the lesion is effective in arresting the hemorrhage in the region of the lesion, temporary exclusion combined with gastroenterostomy should serve the same purpose in so far as control of bleeding is concerned From a theoretical standpoint, probably the best surgical procedure for a penetrating ulcer which is the site of hemorrhage is to open the stomach or duodenum widely near the lesion so that the crater can be visualized and to excise enough of the lesion, either by cautery or scissors, so that the tissues can be approximated by deep, continuous, catgut suture, and to combine this with some operation. either reconstruction of the outlet of the stomach, or gastro-enterostomy, or partial gastrectomy, to modify gastric function sufficiently to give as good prospect as possible for the prevention of further ulceration

The present status of the management of acute hemorrhage from the stomach or duodenum, therefore, may be summarized by saying that until there is some more definite means than are available now of recognizing the small percentage of patients who will succumb to the bemorrhage, any attempt to employ surgical measures in other than those cases in which an obviously severe recurrence of bleeding takes place while the patient is under treatment for hemorrhage, will result in unnecessary deaths, and in sufficient number that the mortality in hemorrhagic ulcer will be higher under surgical treatment than it will be under medical management

DONALD C BALFOUR

MASTER SURGEONS OF AMERICA

LEONARD FREEMAN

N December 27, 1935, Dr Leonard Freeman, then 75 years of age, died of coronary thrombosis at his home in Denver, Colorado A long, active, and productive professional career was closed after an illness of but 3 few days

Dr Freeman, the son of Dr Zoeth Freeman and Ellen Ricker Freeman, was born in Pine Grove, Ohio, on December 16, 1860. He received his primary education in private schools and was graduated from the University of Cincinnati with a B S degree in 1882, and from the Vedical College of Ohio in 1885. He served a year as interne in the Cincinnati Hospital. The next 3 years he spent abroad at the University of Goettingen. He studied pathology under Virchow and hacteriology under Noch. He then pursued postgraduate clinical work in Berlin and Vicina.

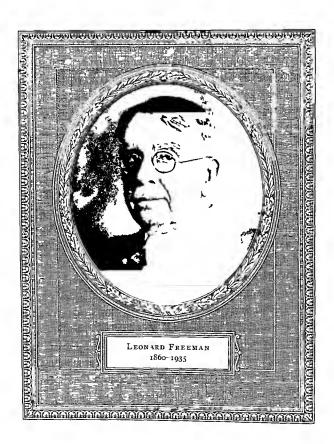
Returning to Cincinnati he taught pathology and bacteriology in the Ohio Medical College and served as pathologist and hacteriologist in Cincinnati Hospital from 1889 to 1891. During these years he was associated with Dr. Phineas Connor then one of the ranking surgeons of the United States

In 1891 his health hroke and he went to Colorado Regaining his health he took a sea voyage on a sailing vessel to Honolulu While in the Hawaiian Islands he spent some time in the Leper Colony at Molokai

In 1894 he marned Miss Amanda Frank of Cincinnati and in 1895 returoed to Denver, Colorado, to live They had three sons Frank, the eldest, an engineer living in Denver, Paul, who ded in 1917, and Leonard, Jr., a surgeon who was associated with his father. His first wife died in 1904. In 1906 he married Miss Iean Which to Denver who with his two sons survive him.

Dr Freeroan became a member of the Gross Medical College of Denver in 1807

From the day of his graduation from Medical College up to the day of the onset of his brief hut fatal illness he assaduously studied and impressively taught practical surgery. Dr. Freeman was of vigorious and powerful phy sique, possessed of the spirit and determination of the true pioneer. Cast in a hig mold, bigness was expressed in his every thought and deed. Unostentiatious, guileless, devoid of pettiness, he could not comprehend the absence of these qualities in others,





therefore he was frequently imposed upon by those less sincere. He was the personification of honesty, the soul of honor and justice, aggressive and coura geous, a staunch defender of the weak, and a champion of the righteous

Dr Freeman was an ardent student of primitive, as well as contemporaneous, surgery both foreign and American. Blessed with an analytical mind and an unfailing memory and with his splendid early training in pathology and bacteriology, it was but natural that he became, and for many years was, one of America's outstanding resourceful surgeons. He was a clear and logical thinker and a forceful terse speaker. What he said or whatever he did was based upon knowledge and personal experience. In his studies, writing teaching, consultation, operations, and discussions, he demonstrated an almost superhuman faculty of grasping essentials. He faced facts. He was authority

In his early years he was interested in archeology. He studied ornithology with Charles Drury, a prominent naturalist of Cincinnati

Dr Freeman was a world traveler On numerous journess through Europe, Central and South America, on voyages to Japan, China the Philippine and South Sea Islands, he never failed to study the hospitals the surgery and surgeous of these often remote countries. He availed himself of every opportunity to delve into primitive and aborginal surgery. These studies resulted in several important papers on the subject. Dr. Freeman's contributions to surgical literature were of wide range, numerous, and valuable.

He was a member and an ex-president and very consistent attendant and contributor of the Denver Clinical and Pathological Society, the Medical Society of the City and County of Denver, the Colorado State Medical Society, and the Western Surgical Association He was an enthusiastic member of the American Surgical Association, the Sociéte Internationale de Chirurgie and the American College of Surgeons

The high regard with which Dr. Freeman was held throughout the West is evidence of his excellent surgery and his stimulating influence on a vast number of students and the younger members of the profession. Dr. Leonard Freeman is dead but the memory of so great a surgeon, so inspiring a teacher, so true a man and such a loy al friend can not die.

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

VERY general surgeon is familiar with the earlier editions of Horsley's Operative Surgery,1 three editions of which appeared from 1921 to 1028 a fourth edition written in co authorship with Isaac A Bigger professor of surgery of the Medical College of Virginia has been published in two vol umes In the second and third editions minor changes were made by adding descriptions of new technical procedures as they became incorporated into standard surgical practice. These early editions were written entirely by Dr Horsley, a general sur geon working however in the entire domain of sur gery. His writings were hased on his own experience except in certain fields of specialism where he relied on his judgment rather than his experience Ifis interests were largely in the field of abdominal surgery consequently this subject was more com pletely and authoritatively covered whereas the other specialties were handled according to his familiarity with those fields of special endeavor

The first popular textbooks on operative surgers ince the beginning of modern surgery had been written with sole emphasis upon the anatomical features of operations later some authors added the developing knowledge of surgical pathology while Horsley marked the growing union of surgery with physiology and the other biological sciences by whit ing his book on operative surgers with stress on physiological principles and biological processes These principles are now firmly fixed in surgical practice In this fourth edition there is a radical change in the character and scope of the work. This change signifies an appreciation of the fact that sur gery has become too large a subject for one man to master Advances in knowledge in the special fields are made by those working intimately in those fields and what was formerly called general surgery has now become a surgical specialty with boundaries as circumscribed as those of other surgical specialties

In addition to Professor Bigger, Dr. Horsley has as collaborators a group of men eminent in the sar gical specialties from the faculty of the Medical College of Virgina. The work now describes more completely the operative procedures of the surgical specialties and its issuance in two volumes adds greatly to the convenience of the reader

Horsley writes as before on subjects that fall under the general principles of surgery and on the operative procedures in surgery of the abdomen Bigger is responsible for the chapters on surgery of the neck.

OPERATIVE SUBGERY By J Shelton Horsley MD LLD FACS and Tease A. Begger MD Vols. 1 and 2 4th ed. St. Louis C V Mosby Co 1917

thorax, breast, herma sympathetic nervous sistem and part of the operations on the extremities. There are sections on neurological surgery by Dr. C. C. Coleman, on urology by Dr. A. I. Dod on on orthopedie surgery by Dr. Donald M. Faulkner, and on plastie surgery by Dr. John S. Horsley, Jr.

The new contributors have used the same pleasing redable narrative style so successfully followed in the previous editions. Fortunately the step descriptions of surgical procedures in which operations were done to the count of the drill master have largely disappeared from surgical hierature. The informal approach used asided hy profuse illustrations grade and the profuse illustrations. The informal approach used asided hy profuse illustrations proton. The illustration, largely hy Vass Helen Lor rame have heen interested by about 500 in number and their uniform excellence and accurace add in mendously to the Charty of the Act of the control of

The chapters on the surgery of the abdomen by Horsley have been amplified and brought fully up to date His views on peptic ulcer haved on physic logical reasoning continue to he of the more con servative nature largely held today by American surgeons. He rides no hobbies and pre ents the sub ject as a master of it The new chapters on the sur gery of the thorax hy Bigger are wisely introduced hy a rather comprehensive discussion of the anatomy and physiology of the chest while the operations de scribed have been carefully selected from the many new technical procedures developed in late years in this latest of the surgical specialties. The chapters on urology neurological surgery and orthopedic and plastic surgery are carefully done and while it is a difficult problem to decide just what the limitations of such presentations should be, the selection of sub ject matter has been skillfully made Obviously a short presentation in a chapter is not adequate to guide the surgeon wishing to become a specialist in any one of these narrow fields But these subjects have been handled so as to he of great value to the man desiring knowledge of surgical technique in these fields The time has not yet come when all sur gery in special fields can be done by masters in them and guides to these procedures are imperative for sur geons who must still cover the wide surgical domain

A book on operative surgery cannot be expected adequately to cover every phase of the pre-operative and postoperative care of the patient but something of this important subject is well given in the discus sion of fundamental surgical principles The young surgeon, bowever, will be obliged to supplement this phase of his work by reading elsewhere. The work should be a popular one as it is suitable for training the surgical interne, and the young surgeon, and forms a valuable addition to the shelves of the ma ture surgeon No other work on operative surgery in English gives such a comprehensive and authoritative presentation of the subject as does this one It will not prove necessary to those who have mastered a specialty but will be of great belp to many of us who still must do work in several fields of surgical specialism The excellent illustrations, pleasing style, and smaller size of the volumes make it attractive to handle and read The fourth edition of this well known work can be bigbly recommended to anyone interested in the subject of surgery changes have been so great that those who own any of the previous editions must get the new edition It will be an indispensable work to the young man wishing to become a surgeon

FREDERICK A COLLER

VALUABLE background for that growing per A sonnel of nurses, technicians, and belpers associated with the physician is furnished in Boyd's An Introduction to Medical Science 1 The book de

AN INTRODUCTION TO MEDICAL SCIENCE BY William Boyd M D M CP (Edin) FRCP (Lond) Dipl Psych FRS (Canada) Philadelphia Lea & Febiger 1931

scribes in the simplest terms the processes of disease in the various organs and systems of the body PAUL STARE

R OSMAN bas caused to be published in modern form a copy of the famous "Reports on Medical Cases Selected with a View of Illustrating the Symptoms and Cure of Disease by a Reference to Morbid Anatomy," published in 1827, together with three other articles by Richard Bright 2 The author then presents an appendix of recent histological and radiological observations on the kidneys of three cases of Dr Bright which are in the museum at Guys Hospital where this remarkable original work was done The colored plates of those original beautiful colored engravings illustrating the different types of renal pathology are well reproduced Dr Bright's paper which appeared in the first volume of Guys Hospital reports in 1836, which is reproduced in this book, "contains an account of the mode, onset, and clinical course of acute nephritis which has probably never been surpassed" Certainly every student and physician will enjoy and derive great inspiration from reading the observations and the protocols which have been recorded by Dr Bright and which Mr Osman has made available to every one in this recent volume

M HERBERT BARKER

*Overord Midical Publications Original Papers of Richard Bright on Renal Disease Edited by A Arnold Osmag DSC PRCP London Oxford University Press 1937

BOOKS RECEIVED

Books received are acknowledged in this department, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender Selections will be made for review in the interests of our readers and as space

THE PRACTITIONERS LIBRARY OF MEDICINE AND SUR ERY VOI 12—PREVENTIVE MEDICINE AND HYGIENE New York and London D Appleton Century Co , 1937 PATHOLOGY OF THE CENTRAL NERVOUS SYSTEM

Cyril B Courville, M.D. Mountain View, California

Pacific Press Publishing Ass, 1937

THE RABBIT TEST, FOR THE DETECTION OF CHORIONIC TISSLE IN THE BODY AND THE DETERMINATION OF ITS PROLIFERATIVE ACTIVITY By S B Anklesaria M D (Bom) With a foreword by Dr Emil Novak Bombay Fort Printing Press, 1937 (Obtainable in Europe or America from H. L. Lewis & Co. Itd., London)

DEVELOPMENT OF THE HUMAN SLELETON Part 1-TRUNK AND EXTREMITIES (Reprinted from an article entitled "An Epiphyseal Chart" by Paul C Hodges in Am J Roentgenol 1933 No 6 Vol 30) Chicago The Um versity of Chicago Press 1937

URGENCES DE CHIRURGIE, TABLEAUX CLINIQUES CON DUITE ATENIR By L Dambrin Paris G Doin & Cie 1937 LA THORACOPLASTIE PAR VOIE AVILLAIRE By F Ch

Ecote W Julien Paris G Done et Ce, 1937 Car Ecote W Julien Paris G Done et Ce, 1937 Thatric Usonovy By Mcredth F Campbell MS, MD FA CS With a Section on Bright's Diesse in Infancy and Childhood by John D Lyttle AB, MD Vols 1 and 2 New Yort The Waterillin Co, 1937

OXFORD MEDICAL PUBLICATIONS POCKET ATLAS OF ANATOMY By Victor Pauchet and S Dupret 3ded New

ANATOMY BY INCOTABLEATH AND STUDYET 3d ed. New York and London Oxford University Fress 1037.
OBSTETRICS TOR NURSES BY JOSEPH B DeLee, A M M D, and Mabel C CATTOM RN 1 tith rev ed. Phila delphia and London W B Saunders Co. 1037.
OXYDEN DEDICAL PUBLICATIONS DIFFERSE AND THE MAN BY ROSET FLAPHAM, A B, M D New York.
OXFORD MAY HERE THE STREET STREET, AND THE CONTROL THE WAS THE THE THE STREET STREET STREET.

Oxford University Press, 1937

SOME FUNDAMENTAL ASPECTS OF THE CANCER PROBLEM

Edited by Henry Baldwin Ward Occasional Publications ol the American Association for the Advancement of Science Science No 4 June, 1937 Supplement to Science, Vol 85 New York The Science Press 1937 OXFORD MEDICAL PUBLICATIONS A TEXTBOOK OF THE

PEACTIVE OF MEDICINE By VANOUS Authors Edited by Frederick W Price, M D C M, F R C P, F R S (Edin) 5th ed New York and London Oxford University Press,

NEUROLOGY By Roy R Grinker, M D, 2d ed Spring field III and Baltimore, Md Charles C Thomas 1937 THE THERAPEUTIC PROBLEM IN BOWEL OBSTRUCTIONS A PHYSIOLOGICAL AND CLINICAL CONSIDERATION Onen H Wangensteen BA, MD, PhD Springfield III, and Baltimore, Md Charles C Thomas 1937

MATERNAL DEATHS—THE WAYS TO PREVENTION By Iago Galdston, M.D. New York The Commonwealth land 1937

COLLECTED PAPERS FROM THE PACULTY OF MEDICINE OSAKA IMPERIAL UNIVERSITY 1936 Osaka, Japan Com piled by the University 1937

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

EUGENE H POOL New York President

FREDERIC A BESLEY, Waukegan President Elect VERNOY C DAVID Chairman Michael L Mason, Secretary, Committee on Arrangements

PROGRAM FOR THE 1937 CLINICAL CONGRESS IN CHICAGO

CLINICAL CONGRESS PROGRAM IN BRIEF

Monday October ...

- to oo Hospital Conference-Grand Ballroom
- 2 oo Clinics in hospitals
- 2 00 Hospital Conference-Grand Ballroom 2 00 Surgical Film Fyhibition-Boulevard Room
- 3 00 Meeting of Initiates-College Auditorium
- 4 00 Reception to Fellows and Initiates College 8 00 Presidential Meeting and Convocation-Grand Ball

Tuesday October 6

- 9 00 Clinics in hospitals
- 10 00 Hospital Conference-North Ballroom 10 00 Surgical Film Exhibition-Boule and Room
- 2 00 Clinics in hospitals
- 2 00 Symposium on Cancer—Grand Ballroom 2 00 Hospital Conference—North Ballroom
- 2 00 Surrical Film Exhibition-Boulevard Room
- 8 00 Scientific Session General Surgery—Grand Ballroom 8 00 Scientific Session Ophthalmology—North Ballroom 8 00 Huspital Conference—Boulevard Room

Il ednesday October ... o co Clinics in hospitals

- 9 30 State and Provincial Judiciary Committees-College Auditorium
- to oo State and Provincial Credentials Committees-Col lege Auditorium
- 10 00 Hospital Conference—North Ballroom 10 00 Suratcal Film Exhibition—Boulevard Room 11 00 State and Provincial Executive Committees—Col
- lege Auditorium 2 00 Clinics in ho pitals
- 2 00 Symposium on Graduate Training for Surgery-Grand Ballroom
- 2 00 Symposium on Obstetrics and Cynecology-North Ballroom 2 00 Hospital Conference-Grant Hospital
- 2 00 Surgical Film I shibition-Boulevard Room 8 00 Scientific Session General Surgery-Grand Ballenom

Thursday October _8

- 9 00 Clinics in ho pitals 10 00 Hospital Conference-North Ballroom
- 10 00 Surgical Film I thibition-Boulevard Room
- 1 30 Annual Meeting-Grand Ballroom 2 00 Clinics in ho-pitals
- 2 00 Hospital Conference—North Hallroom 3 00 Symposium on Industrial Medicine and Traumatic Surgery-Grand Ballroom
- 3 00 Surgical Film Fyhibition-Boulevard Room 8 00 Scientific Session General Surgery—Grand Ballroom 8 00 Scientific Session Otolaryngology—orth Ballroom

- Friday October -0 g oo Clinics in ho pitals
- 10 DO Surrical Film Lyhibition-Rouley and Room 2 00 Clinics in hospitals
- 2 00 Fracture Symposium-Grand Ballroom 2 00 Surgical Film Exhibition-Boulevard Room
- 8 00 Community Health Meeting-Grand Ballroom

THE surgeons of Chicago, under the leadership of a representative committee have prepared a program of chinics and demonstrations that will provide a com plete showing of the clinical activities in all de partments of surgery in this great medical center for the twenty seventh annual Chnical Congress of the American College of Surgeons, October 25-20 The Committee is assured of the hearty cooperation of he clinicians at the five medical schools and more than fifty hospitals that will participate in the clinical program

Published in tentative form in the following nages, the clinical program is to be further revised and amplified during the weeks preceding the Congress Clinics are scheduled for the afternoon of Monday October 25 and for the mornings and afternoons of each of the four following days The final clinical program will be published from day to day during the Congress-a complete de tailed program will be posted in the form of bulle tins at headquarters at the Stevens Hotel each afternoon for the succeeding day and issued in printed form the following morning

In addition to an ample and well arranged schedule of operative clinics demonstrating the technique of a wide variety of surgical procedures, the Committee has arranged a series of demon stration clinics at the medical schools and in several of the larger hospitals where the work being done in many special fields will be presented including Neurosurgery, traumatic surgery thoracie surgery, plastic surgery, fractures, cancer orthopedics genecology and obstetrics, genitourinary surgery, experimental surgery, rocnigen ology ophthalmology, otolaryngology, etc

Also, it is to be noted that the Committee has undertaken to correlate the programs of the participating institutions so that the visiting surgeon may devote his time continuously to clinics dealing particularly with the special subjects in which he is most interested. Thus it has been arranged so that fracture clinics or cancer clinics, for example, will be available each morning and afternoon during the Congress.

EVENING SCIENTIFIC MEETINGS

The Executive Committee of the Board of Regents has prepared programs for a series of evening meetings as published in the following pages. At the presidential meeting and convocation on Monday evening in the ballroom of the Stevens Hotel, Dr Vernon C David, Chairman of the Committee on Arrangements, will deliver the address of welcome following which a number of distinguished foreign guests will be introduced

At this session the returng president, Dr Eugene H Pool, of New York, will deliver the presidential address which will be followed by the inauguration of the new officers Dr Frederic A Besley, of Waukegan, president, Dr Frank W Lynch, of San Francisco, and Dr Austin B Schinbein, of Vancouver, vice presidents A feature of this evening's program will be the annual College oration on surgery by J P Lockhart-Mummery, M B, B Ch, F R C S, of London, England The 1037 class of initiates will be received into fellowship in the College at this session

Emment surgeons of the United States and Canada will present papers on surgical subjects of present day importance at sessions in the grand ballroom on Tuesday, Wednesday and Thursday exemins

On Tuesday and Thursday evenings, in the north ballroom of the Stevens Hotel, eminent surgeons who specialize in the fields of ophthalmology and tolaryngology will present and discuss papers of interest to those whose work is limited to these particular fields

Following its established custom and in recogmitted on the public to provide authoritative information on modern surgery, better hospitals and the prevention of disease, a community health meeting will be held in the grand ballroom on Friday evening. The program consists of brief, interesting talks on scientific medicine, health and hospitals.

CONVOCATION

Departing from the custom of former years the convocation and the presidential meeting of

the College will be combined in one session to take place at the Stevens Hotel on Monday evening, October 25. This change has been made to enable the initiates to participate in the Congress as fully accredited fellows of the College. At the evening meeting, however, the convocation ceremonies will be confined to the formal conferring of fellowship upon the initiates. Other features of the convocation will take place in the auditorium of the John B. Murphy. Memorial Building at 50 East Erie Street on Monday afternoon at 3 00 o'clock. The order of the program follows.

Processional Address by the President Addresses by members of the Administrative Board Recital of the fellowship pollogic Signing of the fellowship roll Closing remarks by the Chairman, Board of Regents

This meeting will be attended by initiates and fellows (fellowship gown to be worn). It will be followed by a reception by the officers and regents for the fellows and initiates and members of their families in the adjoining administrative building of the American College of Surgeons at 4 o'clock.

AFTERNOON SESSIONS

Five afternoon symposia have been arranged dealing with the following subjects Cancer, graduate training for surgery, obstetrics and gynecology, industrial medicine and traumatic surgery, and fractures (Programs appear in following pages)

On Tuesday afternoon a symposium on cancer, under the auspices of the College Committee on the Treatment of Mahgnant Diseases, will include discussions of vanous types of mahgnant grow this occurring in different parts of the body and methods of treating them. As the concluding feature of the session a report on five-year cures supplementing the 24,440 five-year cures reported three years ago, will be presented by Dr. Bowman C. Crowell, field of the Department of Clinical Research of the College

For Wednesday afternoon a symposium has been planned on a subject in which wide interest has been manifested—graduate training for surgery General presentation of the subject will be followed by a report of findings of a special field representative of the College in a 1937 survey of hospitals, after which representatives of various surgical groups, and of teaching, large nonteaching, and rural community hospitals will give their viewpoints. Following this a representative of a large clinic will speak on their experiences in

CLINICAL CONGRESS OF AMERICAN COLLEGE OF SURGEONS

FREDERIC A BESLEY Waukegan President Eled EUGENE H POOL New York President VERNOV C DAVID Chairman MICHAEL L MASON Secretary Committee on Arrangements

PROGRAM FOR THE 1937 CLINICAL CONGRESS IN CHICAGO

CLINICAL CONGRESS PROGRAM IN BRIEF

Monday October 5

10 00 Hospital Conference-Grand Ballroom

- oo Clinics in hospitals
- 2 00 Hospital Conference-Grand Ballroom 2 00 Surgical Film Exhibition-Boulevard Room
- 3 00 Meeting of Initiates-College Auditorium
- 4 ∞ Reception to I ellows and Initiates—College 8 ∞ Presidential Meeting and Convocation—Grand Ball

Tuesday October . 6

9 00 Clinics in hospitals

- 10 00 Hospital Conference-Vorth Ballroom 10 00 Surrical Film Exhibition-Boulevard Room
- 2 00 Clinics in he pitals
- 2 00 Symposium on Cancer—Crand Ballroom 2 00 Hospital Conference—North Ballroom
- 2 00 Surgical I ilm Exhibition Boulevard Room
- 8 00 Scientific Session General Surgery-Grand Ballroom 8 ∞ Scientific Se sion Ophthalmology—North Ballroom 8 ∞ Hospital Conference—Boulevard Room
 - ll ednesday October 7

o oo Clinics in ho pitals

- 9 30 State and Provincial Judiciary Committees-College
- 10 ∞ State and Provincial Credentials Committees—Col. lege Auditorium
- 10 00 Hospital Conference-Sorth Ballroom
- 10 00 Surlical I ilm Exhibition-Boulevard Room 11 00 State and Provincial Executive Committees-Col
- lege Auditorium 2 oo Clinics in hospitals
- 2 00 Symposium on Graduate Training for Surgery-Grand Ballroom
- 2 00 Symposium on Obstetrics and Gynecology-North Ballroom
- 2 00 Hospital Conference-Grant Ho pital 2 00 Surgical Film Exhibition—Bouley and Room

8 00 Scientific Session General Surgery-Grand Ballroom

Thursday October 28 n oo Clinics in hospitals

- 10 00 Hospital Conference-North Ballroom 10 00 Surgical Film Exhibition-Houlevard Room
- r 30 Annual Meeting—Grand Ballroom 2 00 Clinics in hospitals
- 2 00 Hospital Conference-Vorth Ballroom t oo Symposium on Industrial Medicine and Traumatic
- Surgery-Grand Ballroom 3 ∞ Surgical Film Exhibition—Boulevard Room
- 8 00 Scientific Session General Surgery-Grand Ballroom
- 8 oo Scienting Session Otolaryngology-Vorth Ballroom

Friday October . o

- o clinics in hospitals 10 00 Surgical Film Exhibition-Boulevard Room 2 00 Clinics in hospitals
- 2 00 Fracture Symposium-Grand Ballroom
- 2 00 Surgical Film Exhibition—Boulevard Room 8 00 Community Health Meeting—Grand Ballroom

THE surgeons of Chicago, under the leadership of a representative committee, have prepared a program of clinics and demonstrations that will provide a com plete showing of the clinical activities in all de partments of surgery in this great medical center for the twenty seventh annual Chinical Congress of the American College of Surgeons October 25-20 The Committee is assured of the hearty cooperation of he clinicians at the five medical schools and more than fifty hospitals that will participate in the clinical program

Published in tentative form in the following pages the clinical program is to be further revised and amplified during the weeks preceding the Congress Clinics are scheduled for the afternoon of Monday, October 25 and for the mornings and afternoons of each of the four following days The final clinical program will be published from day to day during the Congress-a complete de tailed program will be posted in the form of bulle tins at headquarters at the Stevens Hotel each afternoon for the succeeding day and issued in printed form the following morning

In addition to an ample and well arranged schedule of operative clinics demonstrating the technique of a wide variety of surgical procedures the Committee has arranged a series of demon stration chinics at the medical schools and in several of the larger hospitals where the work being done in many special fields will be presented including Neurosurgery, traumatic surgery, thoracic surgery, plastic surgery, fractures, cancer orthopedics, gynecology and obstetrics genitourinary surgery, experimental surgery, roentgen ology, ophthalmology otolarvngology, etc

tion of hospital furnishings, equipment and supplies, food service, professional problems of the small bospital, the outpatient department,

and other topics

Friday will be devoted to visiting hospitals Nineteen local hospitals and the University of Chicago Chinics will hold demonstrations of a great many phases of hospital operation. These demonstrations have been completely pre arranged and delegates should select at the time they register the ones they wish to attend. Other hospitals may also be visited. Information will be supplied at the headquarters for hospital registration at the Congress.

COLLEGE EXHIBITS

In the scientific exhibit at the Stevens Hotel there will be included displays, charts tabulated results of surveys, and a variety of other material demonstrating the scope of the services rendered

by the College

The Library will have an exhibit and will have a representative available to demonstrate the work of the Department of Literary Research and to consult with persons desiring assistance in the compilation of hibliographies, the preparation of abstracts and translations, or any other service in this field. As each study is individual and personal, it is hoped that many visitors will utilize this opportunity to learn how the department can be of service to the individual doctor, wherever he may be located, in the study of specific problems in which he is interested, and to outline any research he may care to undertake at the time.

Graphs and tables will be displayed showing the progress of hospital standardization over twenty years. They will include in such a way as to be appreciated at a glance, information concerning various aspects of hospital operation and the improvement manifested through the years. A representative will be on hand to give information pertaining to hospital problems and to discuss the manner in which the College cooperatis with hospital administrators in improve-

ing their practices

The Department of Clinical Research will have a comprehensive exhibit, with charts showing the results of findings on five year cancer cures, progress in treatment of fractures, standardization of medical services in industry, and other material Information concerning this important phase of the activities of the College will be supplied by a representative of the department

These exhibits are supplemental to those which may be viewed at the administrative headquar-

ters of the College at 40 East Erie Street All fellows of the College and other guests are cordially invited to visit this building and the adjoining John B Murphy Memorial in order to familiarize themselves with the resources the College provides for them to further their knowledge and to help them in improving their technique. The buildings and furnishings in themselves are well worth inspection because of their unique character and their adaptation to the needs of the College and its fellows.

ADVANCE REGISTRATION REQUIRED

Invitations to attend this year's Clinical Congress in Chicago have been issued, at the direction of the Board of Regents, to fellows of the College, including the 1937 class of initiates, approved applicants for fellowship and members of the jumor candidate group, and officially invited guests. Attendance at the Congress will be definitely limited to a number that can be readily accommodated at the clinics in the hospitals and at the scientific sessions at headquarters.

Those surgeons who wish to attend the Congress should register in advance, paying a registration fee of \$5 co. A formal receipt for the fee will be issued, which receipt is to be exchanged for a general admission card upon registration at head-quarters. This card, which is non transferable, must be presented to secure clinic tickets and admission that the second process of the control of the c

mission to evening meetings

Admittance to clinics and demonstrations will be controlled by means of special clinic tickets, the number of tickets issued for any clinic being limited to the capacity of the room in which that clinic is given. This plan provides a means for the distribution of the visiting surgeons among the clinics and insures against overcrowding.

ANNUAL MEETING

The annual meeting of the governors and fellows of the College will be held in the grand ballroom of the Stevens Hotel on Thursday afternoon at 1 30 o'clock. Reports on the activities of the College will be presented by the officers and chairmen of standing committees, to be followed by the election of officers

COMMITTEE MEETINGS

The attention of fellows is called to the meetings of three committees to be held in Memoral Hall of the College, 50 East Erie Street, Widnesday forenoon, as follows—State and Provincial Judiciary Committees at 9, 5tate and Provincial Credential Committees at 10, State and Provincial Executive Committees at 11.

SURGICAL MOTION PICTURES

The showing of surgical motion picture films which so faithfully depict clinical features of major interest to most surgions will be continued at this year's session. It is planned to present an enlarged program of both sound and salten pictures at daily exhibitions at headquastlers.

INFORMATION BUREAU FOR VISITING LADIES

A committee of Chicago women will sponsor an information bureau to be established at head quarters to aid the wives and friends of visiting tellows in arranging for sight seeing trips, shopping tours and other activities in which they may be interested

HEADQUARTERS AND TECHNICAL EXHIBITION

Headquarters for the Congress will be established at the Stevens Hotelt where the grand ball room with its large foyers and other meeting rooms on the second and third floors have been reserved for scientific sessions and conferences

The Technical Exhibition will be located in the Exhibition Hall in which will be placed the regis tration and clinic ticket but be a placed the regis tration and clinic ticket but boards on which the daily clinical program will be posted each afternoon for the following day Leading manufacturers of surgical instruments via apparatus operating room lights hospital apparatus and supplies of all kinds ligatures, dressings pharmaceuticals and publishers of med incal books will be represented.

RAILWAY RATES

Although no special rates have been authorized by the railways for the Clinical Congress in Cht cago this year and certificates will not be re quired, the railways in the western northwestern southwestern, and southeastern states will offer for sale in October round trip tickets to Chicago at very low rates, with a 30 day return limit in certain territory and a 15 day return limit in other territory. Complete information as to rates, routes and stop over privileges may be obtained from local ticket offees. In the territory east of Chicago, north of the Ohio and Potomac Rivers including the north Atlantic and New England states and eastern provinces of Canada the regular rate of three cents per mile in pullmans and two cents per mile in coaches will be in effect

CHICAGO HOTELS AND THEIR RATES

In addition to the headquarters hotel the Site tens there are several first class hotels within short walking distance of headquarters, providing ample hotel facilities at reasonable rates. It is suggested that reservation of hotel accommodations be made at an early date. The following hotels are recommended by the Committee.

	Single	Double
Auditorium 410 S Michigan Ave	\$2 50	\$4 ∞
Bismarck 171 W Randolph St	3 50	5 00
Blackstone Michigan Ave at 7th St	4 00	6 00
Congress coo S Michigan Ave	3 00	5 00
Drake Michigan and Lake Shore Drive	400	6 00
Great Northern 237 S Dearborn St	2 50	4 00
Harrison 57 F Harrison St	2 50	3 50
Anscherborker 162 E Walton Pl	3 00	5 00
LaSalle 10 N LaSalle St	3 00	4 50
Morrison 79 W Madison St	3 00	4 00
Palmer House 15 F Monroe St	3 50	5 00
Sherman 106 W Randolph St	2 50	4 00
Stevens 220 S Mithigan Ave	3 00	4 50

PROGRAMS FOR EVENING MEETINGS

Presidential Meeting and Contocation-Monday 8 oo P M -Ballroom, Stevens Hotel Address of Welcome Vernon C David, M D, Chicago, Chairman, Committee on Arrangements Introduction of Foreign Guests

Address of the Returng President EUGENE H POOL, M D . New York

Inauguration of Officers

Conferring of Fellowships Frederic A Besley, M.D., Waukegan, Ill., President

Conferring of Honorary Fellowships The President

Medical Records Honor List and Prize Award The President

Annual Oration on Surgery The Surgeon as a Biologist I P LOCKHART MUMMERS, M B . B Ch . F R C S . London, England

I uesday, 8 oo P M -ballroom, Stevens Hotel

Treatment of Pentic Ulcer

Indications for Surgery JAMES H MEANS, M D , Boston

Technique of Surgical Treatment ROSCOE R GRAHAM, M.D., Toronto Nucleus Pulnosus and Lower Back and Sciatic Pains HOWARD C NAFFZIGER, M D . San I rancisco The Relation of Chronic Cystic Mastitis to Cancer of the Breast Dean Lewis, M.D., Baltimore

Wednesday, 8 oo P M -Ballroom, Stevens Hotel

Greetings to the Visiting Surgeons George W Post, IR, M.D., Chicago, President, Chicago Medical Society Lymphedema

The Genesis and Consequences of Lymphedema CECIL K DRINKER, M D , Boston Circulatory and Lymphatic Disturbances in the Abdomen Willis D Garcii, M.D., Indianapolis Diverticula of the Intestine Claude F Divon, M.D., Rochester, Minn. Immediate or Delayed Treatment of Acute Cholecystitis HENRY W CAVE, M.D., New York

Thursday, 8 oo P M -Ballroom, Stetens Hotel

Tuberculosis of the Kidney Frank Hinnan, M.D., San I rancisco

Physiological and Pathological Changes in the Urinary Tract during Pregnancy | 1 Mason Hundley, In . M D . Baltimore

Acute Pancreatitis IRVIN ABELL, M D . Louisville

Fracture Oration The Present Status of the Operative Treatment of Fractures William O Neill SHERMAN, M D . Pittsburgh

Community Health Meeting-Friday, 8 oo P M -Ballroom, Stevens Hotel

Frederic A Besley, M.D., Waukegao, Ill., President, American College of Surgeons Presiding The American College of Surgeons-Its Aims and Objects George Crile, M.D., Cleveland, Chairman, Board of Regents, American College of Surgeons

The Seven Wonders of Medicine BOWMAN C CROWELL, M.D., Chicago Associate Director, American College of Surgeons

The Approved Hospital-How It Benefits You MALCOLM T MACLACHERN, M D, Chicago, Associate Director, American College of Surgeons

What Everyone Should Know about Cancer CLARENCE C LATTLE, Ph D , New York, Managing Director. American Society for the Control of Caocer

Prenatal and Maternal Care FRANK W LYNCH, M D , San Francisco, Professor of Obstetrics and Gyne cology, University of California Medical School

Patients, Doctors and Hospitals Robert Jolly, Houston, Superintendent, Memorial Hospital

PROGRAMS FOR EVLNING MEETINGS-CO STINUED

SURGERY OF THE EYE

Tuesday, 8 oo P M -North Ballroom Sierens Hole!

Surgery of the Cornea Ranon Castroviejo, M D , New York

Exophthalmos Albert D RUEDEMANN, M D, Cleveland

The Modern Surgers of Retinal Detachment HARRY S GRADLE M D, and SAMUEL J MEYER, M D

Differential Diagnosis and Surgical Treatment of Strabismus AVERY D PRANGEN, M.D., Rochester,

Minn Trachoma PFTER C KRONFELD M D, Peiping China

SURGERY OF THE EAR, NOSE, AND THROAT

Thursday 8 00 P M -North Ballroom Stevens Hotel

The Surgical Treatment of Various Types of Lesions in the Petrous Pyramid Samuel I Kopetzry M.D. New York

Infections of the Paranasal Sinuses of Dental Origin John J Shea M D Memphis, Tenn Tumors of the Nasopharynx Albert C Furstenberg, M.D. Ann Arbor, Mich. The Significance of Hourseness Francis E I FIRUNE M D New Orleans

PROGRAMS FOR AFTERNOON SESSIONS

SYMPOSIUM ON CANCER

Tuesday, 2 00 P M -Ballroom, Stevens Hotel

CHARLES A DUKES M D Oakland Charman of Committee on the Treatment of Mahinant Diseases presiding

Correlation of Body Segmental Temperature and Its Relation to Metastatic Caremonia Clinical Observa tions and Response to Methods of Refrigeration Temple Fay M D George Henny M D, and ALGESTES MCCRAVIY M D Philadelphia

The Treatment of Cancer of the Rectum J P LOCKHART MUNNERY M B , B Ch , F R C S , London Paget's Disease of the Nipple Sir George I enthal Chratte, I R C S, London

Cancer of Fsophagus John H Garlock, MD, New York

Carcinoma of Thyroid HAROLD L Foos M D Danville Pa

The Role of Cystectomy in Mahgnant Tumors of the Bladder CHARLES C HIPCINS M D Cleveland Presentation of Five Year Cures BOWMAN C CROWLL M D . Chicago

SYMPOSIUM ON OBSTETRICS AND GYNECOLOGY

Il ednesday 2 00 P M -North Ballroom Stevens Holel

FRANK W. LYNCH M.D. San Francisco Vice President, American College of Surgeons presiding Conservatism in Obstetrics George W Ko mak M D New York

Water Balance in Relation to Totemias of Pregnancy M Edward Davis, M D Chicago Abdominal and Pelvic Pain from the Gynecological Viewpoint Arthur H Curtis M D Chicago

Cesarean Section JOHN R FRASER, M.D. Montreal Differential Diagnosis in Inte tinal Utimary and Gynecological Diseases Floyo E FEENE M.D., Phila

delphia Syphilis in the Pregnant Woman James R McCord M D, Atlanta

SYMPOSIUM ON GRADUATE TRAINING FOR SURGERY

Wednesday, 2 oo P M -Ballroom, Stevens Hotel

FREDERIC A BESLEY, M D, Waukegan, Ill, President, American College of Surgeons, presiding Opening Remarks George Crile, M.D., Cleveland, Chairman, Board of Regents, American College of Surgeons

Purpose of Conference MALCOLM I MACEACHERN, M D, Chicago, Associate Director, American College

Graduate Training for Surgery ALTON OCHSNER, M D, New Orleans

Findings from the 1937 Survey of Hospitals by the American College of Surgeons MELVILLE H MANSON, M D, Minneapolis, Special Field Representative

Discussion from the following viewpoints

The Surgeon in the Teaching Hospital DALLAS B PHEMISTER, M D, Chicago

The Surgeon in the Large Non Teaching Hospital Donald Guthrie, M D . Savre. Pa

The Surgeon in the Rural Community Hospital Howard L SNYDER, M D , Winfield, Kan

The American Surgical Association EUGFNE H POOL, MD, New York

The American Board of Surgery Evants A Graham, M D, St Louis

The American Medical Association FRED W RANKIN, M.D. Levington Ky

Significant Experiences in the Training of Surgeons on a Graduate School Basis Louis B Wilson, M D , Rochester, Minn

Discussion Otolary ngology - Perry G Goldsmith, M.D., Toronto, Urology - Frank Hinman M D , San Francisco, Gynecology and Obstetrics-ARTHUR H CURTIS, M D , Chicago

SYMPOSIUM ON INDUSTRIAL MEDICINE AND TRAUMATIC SURGERY

Thursday, 3 00 P M -Ballroom, Stevens Hotel

Frederic A Besley, M.D., Waukegan, III, Chairman of Committee on Industrial Medicine and Traumatic Surgery, presiding

Recognition and Prevention of Lead Poisoning Robert Arthur Lehoe, M.D., Cincinnati Reconstruction Surgery of the Face and Jaws Dr. Med. Wolfgang Rosenthal, Leidzig

Injuries of the Chest and Abdomen EDMUND BUTLER, M.D. San Francisco.

The Modern Concept of the Industrial Medical Problem M N Newquist, M D . Chicago

Reconstruction of Scalp and Ear by Tube Graft Method JAMES A CAMILL JR, MD, Washington, DC Physical Therapy in Relation to Industrial Surgery Kristian G Hansson, M D . New York

SYMPOSIUM ON FRACTURES

Friday, 2 oo P M -Ballroom, Stevens Hotel

Frederic W Bancroft, M D , New York, Chairman of Committee on Fractures, presiding

Organization of Regional Fracture Groups CHARLES L SCUDOER, M.D., Boston Functional Disabilitier after Simple Fracture Fraser B Gurn, M.D., Montreal

Fractures of the Shaft of the Humerus J HUBER WAGNER, M D , Pittsburgh

Topic to be announced WILLIAM H OGILVIE, FRCS, London

fractures of the Bones of the Hand HUBLEY R OWEN, M D , Philadelphia

Malunion in Fractures Willis C CAMPBELL, M D, Memphis, Tenn

Fracture of Both Bones of the Forearm (excluding Colles' Fracture and Fractures into the Elbow Joint) WILLIAM B CARRELL M D , Dallas, Texas

ANNUAL HOSPITAL STANDARDIZATION CONFERENCE

Monday 10 00-Ballroom Stevens Hotel EUGENE H POOL M D New York, President American College of Surgeons presiding

President's Address

Report of the 1937 Survey of Hospitals and Official An nouncement of the Approved Ist George Crine M D Cleveland Chairman Board of Regents Amen can College of Surgeons

The Approved Hospital and Its Obligation—Diagnosis and Therapy Education, Prevention and Pescarth BEST W CALDWELL M D Chicago

Personality and Psychology in the Ho pital G Harvey Agnew M D Toronto Trends in Medical Education John H I Upham, M D Columbus Ohio

Criteria to be Ob erved When Selecting Internes and Residents IA IES H MEANS MID Boston Surgical Organization in Non University Connected Hos-pitals CHARLES A BOWERS M.D. Cleveland

The Effect Hospital Insurance Plans Are Having on Medical and Hospital Services C Rufus Rorem, Ph D Chicago

Monday . on-Ballroom Stevens Hotel GEORGE E WILSON M.B. Toronto Vice President, American College of Surgeons presiding

The Medical Staff Conference-with Panel Discussion from the Following Viewpoints

General Presentation of Subject HAROLD L Foss, M D Danville Pa Proper Attitude of the Medical Staff James T Nex VID New Orleans

Time Place and Physical Essentials William H Walsii M D Chicago Conduct of the Conference I DWARD L DUORY MD

Duluth Minn Criteria of a Good Medical Staff Conference FELIX P

MITTER M D El Paso Texas
Demonstration— A model medical staff conference by the medical staff of Ravenswood Hospital Chicago

Tuesday 10 00-Yorth Ballroom Stevens Hotel F WELDON YOUNG MD Seattle Wash presiding Chincal Departments of the Hospital Embracing Organi zation Direction Control Functioning

Oral Surgery and the Dertal Department in the General Hospital William H G Logan M D , Chicago Psychiatric Department in the General Hospital Sameet W HAMILTON MD New York

The Physical Therapy Department in Small Medium and Large General Hospitals John S Coulter M D Chicago

The Out Patient Department in the General Hospital CHRISTOPHER G PARNALL M D Rochester N 1 The Obstetrical Department in the General Hospital OTTO H SCHWARZ M D St Louis

Tuesday ... 00-\orth Ballroom Stevens Hotel FRED G CARTER M D Cincinnati presiding Group Hospital Administration D ALLAN CRAB. M D Tornngton Conn

Hospital Personnel Management-with Panel Discussion from Various Viewpoints General presentation of subject FRANK I WALTER Denver

Selection I MURISE AND COMBE R N St Lows

Physical Health HAROLD L SCANNELL M D Habitar. Assignment of Duties CLINTON F Suith Chicago Working and Living Conditions JO EPH G NORBY Milwaukee

Morale MACTE N KNAPP R N Normal III Training and Education of Hospital Personnel George O HANLON M D Jersey City N J

Tuesday, 8 on P M -Boulevard Room Stevens Hold Joint Session with Chicago Hospital Association and

Chicago Hospital Council CHARLES H SCHWERPE Chicago presiding Public Relations-with I and Discussion from the Follow ing Viewpoints

General presentation of subject Perry Applement Chicago

The Hospital Administrator Ana Belle McClerry RN Evanston III The Member of the Med cal Staff FREDERIC J Corrow

MD Boston The Press HOWARD W BLAKESLET New York Fund Raising Paul II Frsier Chicago

Community Good Will A LDWARD A HUDSON Waynesbore Va

11 ednesday 10 00- Vorth Ballroom Sterens Hotel Joint Session with Association of Record Librariancel North America R C BLEREI M D Made on Wis pre iding Developing a Medical Record Consciousness in the Hos

pital Sister M PATRICIA OSB BS, RRL Duluth Minn What Constitutes a Proper Appraisal of the Medical

Perord CHARLES B PUESTOW M.D., Chicago and LILLIAN H ERICKSON R.R.L. Milwaukee Incomplete Medical Records—Causes and Remedies
ALICE G ATRALAND, R.R.L. Orlkand Cali
The Remunerative Value of Good Medical Records
RICHARD B DAYES M.D. Greensboro N.C.

The Technique of Making Group Studies of Diseases TROMAS R LONTON MID Chicago

Il ednesda) 2 00-Grant Hospitul

Conversation Round Table Conference-Your and My Medical Records Problem and How We Solve Them EDNA L HUFFMAN R.R.L. Chicago Coordinator ESHIFE BADGER RR L San Leandro Calif GENE VIEWE CHASE RR L BOSTON JESSIE N HARRES RR L Checago Heller A Hayes R R L Checago Heller A Hayes R R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Heller A Hayes R L Cleveland Shife Name of the Checago Hayes Name of the Checag M HILDA RR L JOHE III JERNIE C JONES RR L
Baltimore WESLEY'A SMITH RR L MI, MI GITGO
N FILEMENT H. TERRUNE PR L. Davenport
Lova EVELIN VERDENBURG RR L New York

Playlet - History Is Made in a Chinic -Presented by the Medical Resords Librarians Children's Memorial Hospital (hicago

Thursday to ou-Aorth Bollroom Stevens Holel Panel Round Table Conference-Problems Relating to Hospital Administration and Ho pital Standardization Conducted by ROBERT JOLLY Houston Texas and R C BLIRAL M D Madison Wis

Call Systems for Hospitals John Corrett, M.D., Grand Rapids Mich

Administrative Problems of the Small Hospital Gladys
Brandt R N , Logansport, Ind
Nursing Service Sister Mary Lidwina, Chicago

Medical Social Service Standards BABETTE JENKINGS Chicago Air Conditioning in Hospitals Perry W Sween, Chicago Hospital Income Brice L Twitty, Dallas, Texas The Hospital Pharmacy Edorar C HAYHOW, Paterson,

Thursday, 2 00—North Ballroom, Stetens Hotel
Standardization of Hospital Furnishings, Equipment and
Supplies John N HATFELD, Philadelphia
Food Service Micrail C Converty, Baltimore

Professional Problems of the Small Hospital Mary E Skeoch, R.N., Marquette, Mich Nursing Education Mary M. Roberts, R.N., New York Out Patient Department FREDERICK MACCURDY, M D, New York

The Cancer Clinic in the General Hospital Frank E Adam, M D New York The Front Office of the Hospital Lee C Gammill, Little Rock, Ark

Friday 10 00 and 2 00

An opportunity will be afforded the hospital delegates to visit Chicago hospitals Demonstrations in the following hospitals will be arranged Augustana Chicago Lyung In, Chicago Memorial, Children's Miemorial, Cook County Grant, Henrotin, Michael Reese, Mount Sinai, Passivani Memorial Preshyterian, Ravenswood, Research and Educational St Elizabeth, St Joseph's, St Luke's, St Mary of Nazareth, University of Chicago Chimcs, Wesley Memorial West Suburban

COMMITTEE ON ARRANGEMENTS

Executive Committee
VERNON C DAVID, Chairman
MICHAEL L MASON, Secretary

FRED L ADAIR
RALPH B BETTMAN
ALEXANDER BRUNSCHWIO
FREDERICK CHRISTOPHER
WARREN H COLE
EDWARD L COMPERE
JOHN S COULTER

WILLIAM R CUBBINS HARRY CULVER LOYAL DAVIS GLORGE DETARNOWSEY LESTER R DRAGSTEDT HARRY GRADLE M J HUBENY SELIM W MCARTHUR
KARL A MEYER
ALBERT H MONIGOMERY
OSCAR E NADEAU
DALLAS B PHEMISTER
SAMUEL SALINGER
C F SAWYER

HOSPITAL REPRESENTATIVES Alexian Brothers Hospital-Daniel Murphy Augustana Hospital-Oscar Nadeau Albert Merritt Billings Hospital-Dallas B PREMISTER Chicago Lying In Hospital—Fred L Adair Chicago Memorial Hospital—Peter Clark Children's Memorial Hospital—Albert H Mongomery Columbus Hospital—Daniel Orth Cook County Hospital-Karl A MEYER Englewood Hospital-WILLIAM S HECTOR Evangelical Hospital-G HENRY MUNDT Evangelical Deaconess Hospital-E M HEACOCK Evanston Hospital-Frederick Christopher Garfield Park Community Hospital-JOHN R HARGER Grant Hospital—A G ZIMMERMAN Henrotin Hospital—CHARLES PUESTOW Holy Cross Hospital-John F Ruzio Illinois Central Hospital-William T HARSHA Illinois Eye and Ear Infirmary—Thomas D. Alten Illinois Masonic Hospital-Charles H Parkes Jackson Park Hospital—Arrie Bamberger Lewis Memorial Hospital—Morgan J O Connell Lutheran Deaconess Hospital—George H Schroeder Lutheran Memorial Hospital—Henry Bundaum Mercy Hospital—Charles I' Sawyer Mother Cabrini Memorial Hospital—Eugene J Chesrow Mount Smar Hospital-A E KANTER Municipal Contagious Hospital-Archibald I Hoyse Municipal Tuberculosis Sanitarium-I FO M CZAJA

Northwestern University Medical School (Ophthal mological Department)—Sanford R Gifford Norwegian American Hospital-Warren Johnson Passavant Memorial Hospital-Loyal Davis Post Graduate Hospital-RICHARD A LIFVENDARL Presbyterian Hospital-ALBERT H MONTGOMERY Ravenswood Hospital-George DETARNOWSKY Michael Reese Hospital-Ralph B Bettman Research and Educational Hospitals-WARREN H COLE Rush Medical College (Ophthalmological Department)— WILLIAM J MONGRETER St Anne's Hospital—Thomas E Meany St Anthony de Padua Hospital-FRED SLOBE St Bernard's Hospital-S L GOVERNALE St Elizabeth's Hospital-Martin G Luken St Francis Hospital-W L WANER St Joseph's Hospital—Austin A Hayden St Luke's Hospital—Selim W McArthur St Mary of Nazareth Hospital—George Mueller Shriners' Hospital—Beveringe Moore South Shore Hospital-Guy Van Alstyne Swedish Co enant Hospital—KARL L VEHE US Marine Hospital—M J WHITE University of Chicago (Ophthalmological Department)-E V L BROWN Veterans Administration Facility-Paul Brown

Washington Boulevard Hospital—ARTHUR METZ Wesley Memorial Hospital—AR W McNealy Frances E Willard Hospital—JAMES A VALENTINE Women and Children's Hospital—VAUDE H WINNETT

PRELIMINARY CLINICAL PROGRAM

ARRANGED IN THE FOLLOWING SUBDIVISIONS GENERAL SURGERY, GYNECOLOGY AND OBSTETRICS ORTHOPEDIC SURGERY, FRACTURES AND TRAUMATIC SURGERY, GENITO URINARY SURGERY, THORACIC SURGERY, NEUROSURGERY, ROENTGENOLOGY, TUMORS AND IRRADIATION, Physical Therapy Plas TIC AND FACIOMAXILLARY SURGERY, EXPERIMENTAL SURGERY, OPHTHALMOLOGY, OTOLARYNGOLOGY

GENERAL SURGERY

Monday Afternoon CHICAGO MEMORIAL HOSPITAL

CHARLES J DRUECE SA GEORGE L BROOKS OTTO SAPHIR and GEORGE LANDAU Symposium Carcinoma of the rectum carcinoma of the colon

CHARLES E KAHLLE GEORGE L BROOKS OTTO SAPHIR and George Landau Symposium Peptic ulter

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

SUMMER L KOCH MICHAEL L MASON and HARVEY S
ALLEN Surgery of the hand Dupuytren a contracture Volkmann's contracture nerve and tendon suture burn contractures of the hand and plastic repair with skin grafts chronic tenosynovitis

ST ANTHONA DE PADUA HOSPITAL R C DRURY Spinal anesthesia

ST BERNARD'S HOSPITAL

W S HECTOR and S S DUBOLY Imperiorate anus with atresia of large bowel

B C CLEHNAY R J MAIER and E K LEWIS Roentgen therapy of inflammation and infection of face and neck ROCCA FAZIO Blood transfusion and ments of accepted methods

WOMEN AND CHILDREN'S HOSPITAL CLEMENTINE FRANKOWSKI and HELEN M. KOSTKA. Vari

cose veins Treatment by injection and by ligation anatomic demonstration

> Tuesday Morning AUGUSTANA HOSPITAL

N M PERCY Operations ALBERT MERRITI BILLINGS HOSPITAL

D B PHEMISTER L R DRAGSTEPT A BRUNSCHBIG W E Adams and associates Operations

Symposium Gastro-Intestinal Surgery LESTER R DEAGSTEDT and staff Clinical and experimental studies in gastric and duodenal ulcer

WALTER L PALMER F E TEMPLETON and RUDOLF SCHINDLER 's ray and gastroscopic studies of gastric ulcer under medical treatment

A BRONSCHWIG Pancreatoduodenectomy for carcinoma of the head of the pancreas H P JENKINS Abdominal wound disruption and the

durability of catgut sutures

CHICAGO MEMORIAI HOSPITAL CHARLES E KAHLLE Stomach surgery

CHARLES J Daubek Sx Surgery of the colon and rectum

COOK COUNTY HOSPITAL

HARRY JACKSON and PHILLP SHAPIRO Symposium Shall

fractures KARL A MEYER R H JAFFE M J HUBENY AARON ARKIN and RUDOLP SCHINDLER Symposium Surgery of

the stomach with operative clinic DE GATEROOD and S LAWTON Fracture surgery in chil

dren GEORGE DAVIS Operations

A 11 MONTGOMERY and F H STRAUS Operations JOHN HARGER and A J STOKES Peridural anesthesia in abdominal operations with operative clinic

HARRY JACKSON and PHILIP SHAPIRO Operations G FROST and J M ROBERTS Operations LINDON SEED Operations

VICTOR L SCHRAGER and B J FITZGERALD Symposium Appendicitis

Members of the surgical staff will give demonstrations in surgical technique upon cadavers and dogs in the laboratories of the Graduate School of Medicine 427 5 Honore Street J L Servaca Gastrostoms

EVANGELICAL DEACONLSS HOSPITAL LDWARD N HEACOCK Cholecystectomy

GARFIELD PARK COMMUNITY HOSPITAL Symposium Gall Bladder Disease

EDMUND FOLEY Ethology and diagnosis
HAROLD N WAIT \ ray diagnosis SAMUEL PLICE Heart in gall bladder disease FRED DESTERANO Anesthesia CLAUDE WELDY Surgery

GRANT HOSPITAL

KARL A MEYER and LINDON SEED Operations and demonstration of cases

HOLY CROSS HOSPITAL V F TORCZYNSKI Cholecystectomy appendectomy hysterectomy

M] BADZMIEROWSKI Thyroidectomy, 5 cases cholecystectomy

J Dynalski Cholecystectomy 3 cases nephrectomy hysterectomy A J MANIKAS Appendectomy

JACKSON PARK HOSPITAL

G M LUCAS Operations W MORLEY SHERIN Gall bladder surgery Symposium Appendicitis

A BAMBERGER Surgical aspect
R R JAMIESON Medical aspect
J Mioore Pathological aspect

LUTHERAN DEACONESS HOSPITAL JOHN D KOLCKY G H MAMMEN and GLORGE H SCHROERER Operations

MERCY HOSPITAL

Dry Clinic
C F Sawyer and W O Fitzgerald Unusual causes of intestinal obstruction, partial and complete gastrectomy M McGuire and J H Mohardt Pelvic appendicitis, obstructive jaundice

MOUNT SINAI HOSPITAL

V Schrager Operations J GAULT Technique of high internal saphenous vein liga

P KAPLAN Tubulovalvular gastrostomy

MUNICIPAL TUBERCULOSIS SANITARIUM

CLEMENT MARTIN, A C WENDT and LOUIS MORRIS Anorectal tuberculosis demonstration of ulceration of gastro intestinal tuberculosis, rectal fistulae and other anorectal lesions

MAX THORER and PHILLIP THOREK General surgery in tuberculous patients

JOHN S COULTER, LEO HARDT, MAURICE WEISSMAN and LEON GORFINKEL Ultraviolet radiation in the treat ment of gastro intestinal tuberculosis study of over 200 cases, comparison of the therapeutic effects of high vitamin smooth diet calcium and ultraviolet radiation

NORWEGIAN AMERICAN HOSPITAL WARREN JOHNSON Operative gynecological and abdomi

nal surgery

M E LICHTENSTEIN Extrabiliary passages, demonstra tion of specimens with clinical and physiological signifi-

J V FOWLER and DR FISHBACK Clinical and pathological conference, ovarian tumors with microprojectoscopic demonstration

PRESBYTERIAN HOSPITAL

KELLOGG SPEED, ALBERT H MONTGOMERY, DR GATE woop and associates Operations Dry Clinic

VERNON C DAVID Selection of operation in carcinoma of large bowel

CARL B DAVIS Methods of closure of duodenal fistulae LOWIN M MILLER Nonfunctional gastro enterostomy MARK LORING Extra congenital lesions of granuloma inguinale

R GILCHRIST Demonstration of lymphatic extension in carcinoma of large bowel

HILIER L. BAKER Lipiodol visualization of the bile tract E H FELL Complications encountered in 500 blood transfusions

RAVENSWOOD HOSPITAL

P J SARMA Varicose veins, ligation and obliterative treatment

R E Dier End results of gastro enterostomies, dem onstration of cases D B POND and R F GREENING Osteomyelitis

J J MOORE Tumors of breast

D L JENKINSON & ray interpretations

GEORGE DE TARNOWSKY Exstrophy of bladder

C J GEIGER Ectopic ureter and absence of vagina, cervi cal carcinomas M W FILLD Obstetric practice by general practitioner

W F GROSVENOR Tovemia in pregnancy
W C HAMMOND Endometriosis

MICHAEL REESE HOSPITAL

D C Strals Thyroid operations
RAIPH B BETTMAN and WILLIAM TANNENBAUM Gall bladder surgery

A A STRAUSS Gastro intestinal surgery JAMES PATEJOL Operations

P SHAPIRO Operations

Symposium Gastro Intestinal Diseases A A STRAUSS Surgical treatment of peptic ulcer S STRAUSS Pre and postoperative care of the ulcer pa

JAMES PATEJOL Perforating ulcer, surgical treatment
JACOB MEYER Medical care of the ulcer patient Symposium Carcinoma of the Rectum

A A STRAUSS Surgical management S STRAUSS Surgical diathermy, after care and results of surgical diathermy

M APPEL Histocytic variation in cancer tissue GUSTAV KOLISHER History of surgical diathermy OTTO SAPHIR Pathology of the rectum following surgical diathermy

RESEARCH AND EDUCATIONAL HOSPITALS GEZA DETAKATS Lumbar sympathectomy operation

Symposium Neurocirculatory Diseases R Brunner Use of neosynephrine in spinal anesthesia

PAUL M SMITH Mechanisms governing peripheral circu lation WILLIAM C BECK Selection of cases for sympathectomy,

demonstration of sympathectomized patients, evaluation of results, management of lymphedema F K HICK Vascular accidents associated with coronary

disease H C LUETH Unusual reactions following the use of nitro

glycerine GEZA DETAKATS Treatment of acute arterial occlusion, operability of hypertension, demonstration of cases EUNICE ROTH Observations on and results of suction and

pressure (pavaex) therapy P J SARMA and H L MISHKIN Varicose veins and ulcers J T REYNOLDS Amputations in peripheral vascular dis ease

ST ANTHONY DE PADUA HOSPITAL JOSEPH ZABOKRTSLY Operations

ST BERNARD 5 HOSPITAL

J T MEYER E J MEYER and R J MEYER Thyroidec W G EPSTEIN and M MENNITE Abdominal surgery and

differential diagnosis of acute abdominal lesions ST JOSEPH'S HOSPITAL

WILLIAM C BECK Thoracic surgery ARCHIBALD HOYNE Control of contagion in surgical dis

WILLIAM H G LOGAN Oral surgery FRANKLIN B McCarty Gall bladder surgery CHARLES M McKENNA Undescended testicle HUGH MCKENNA Fractures Conservative surgery in dia betic gangrene

FRANK THEIS Peripheral circulatory diseases Pathological and radiological material illustrating the

above will be presented by LAWRENCE HINES, pathologist, and WILLIAM E ANSPACH radiologist

ST LUKE'S HOSPITAL

WILLIAM R CUBBINS Arthroplastics of hip joint GUY PONTIUS Regional ileitis, local bowel resection for malignancy

H I MEYER Hashimato's disease H E Mock Operations

ST MARY OF VAZARETH HOSPITAL

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EDWARD WARSZEWSKI GEORGE R MUELLER and I C HILL Ulcerative colitis-diagnosis and treatment case histories demonstration of specimens

G MUELLER and J C Hith Regional ileitis-histories diagnosis treatment demonstration of specimens

SOUTH SHORE HOSPIFAL

HUGH MACKECHNIE Surgical treatment of pentic ulcer

VETERANS ADMINISTRATION FACILITY PAUL F BROWN BENJAMIN F WARD, JOSEPH E BARSS and MERRILL H JUDD Operations

WESLEY MEMORIAL HOSPITAL

R W McNealy E R Strauser and F L Hussey Gastric surgery pre-operative decompression and post operative fluid management

Tuesday Afternoon CHICAGO MEMORIAL HOSPITAL BENNETT R PARKER Thyroid surgery

COOK COUNTY HOSPITAL

E I LEWIS and E LATTMER Operations

HOLY CROSS HOSPITAL M I BADZMIEROWSKI Pre and postoperative treatment

of thyroid disease M HOELTGEY Surgical anatomy and pathology of tonsil

IACKSON PARK HOSPITAL

HARRY E L TIME Operations MERCY HOSPITAL

C L MARTY Rectal neoplasms and inflammations
J E Kelley The hernia pmblem

MUNICIPAL CONTAGIOUS DISEASE HOSPITAL ARCHIBALD HOYNE and associates Intubation and trache otomy discussion of the advantages and disadvantages of intubation and tracheotomy

PASSAVANT MEMORIAL HOSPITAL

J R BLUBSINDER A C IVY and ARTHUR BYFIELD Symposium on the bilary tract

MICHAEL REESE HOSPITAL

Dry Clinic NATHAN CROHY The use and abuse of the injection treat

ment of herma suitable and unsuitable cases methods Leo Zimmerman Surgery of direct inguinal herma RUDOLF SCHINDLER The use of the gastroscope and its value to the surgeon

SAMUEL GOLDBERG Pooled human convalescent serum treatment of surgical streptococcus hemolyticus infec

IAMES PATE IDL. Concenital duodenal obstruction in new born duodenal diverticuli causing clinical symptoms Dry Clinic

LEO ZIMMERMAN Diseases of veins PHILIP SHAPIRO Recent advances in the treatment of

varicose veins BERNARD PORTIS Embolism of the peripheral arteries
SAMUEL PERLOW Surgical measures used in the treatment

of peripheral circulatory disturbances differentiation between arterial and arteriolar spasticity as an aid in the selection of cases for sympathetic gangionectomy

ST LUKES HOSPITAL

WHITAM HAZLETT Pseudohermaphroditism carcinoma of breast in a fifteen year old girl

ST MARY OF NAZARETH HOSPITAL

P DORETTI and T PLANT Abdominal operative clinic I C HILL Operations

VETERANS ADMINISTRATION FACILITY

PAUL F BROWN Symposium Stomach surgery-eastro enterostomy pyloroplasty, gastric resection with tech moue of operations

WOMEN AND CHILDREN'S HOSPITAL

Management of Diseases Complicating Surgery CAROLYN MACDONALD Syphilis ROSE MENENDIAN Endocrine disorders RUM REVIER DARROW Diabetes

Wednesday Morning

AUGUSTANA HOSPITAL

A T LUNDGREN EARL GARSIDE, R J E OWEN and J W Nuzum Operations

ALBERT MERRITT BILLINGS HOSPITAL

D B PHEMISTER, L R DRAGSTEDT A BRUNSCHWIC W E ADAMS and associates Operations

CHICAGO MEMORIAL HOSPITAL

PETER S CLARE, VANCE RANSON GEORGE LANDAU and OTTO SAPHIR Gall bladder symposium Surgical aspect medical aspect x ray and pathological aspect. LEO M ZIMMERMAN and RICHARD F HELLER Fundamen tal problems in the aurgical treatment of inguinal hernia modern management of varicose veins

CHILDREN'S MEMORIAL HOSPITAL

Albert H Montgowery and associates Operations Dry Clinic ALBERT H MONTOOMERY Abdominal tumors in children

W J Ports Appendicitis in children
LAY IRELAND Mesenteric lymphadenitis

COLUMBUS HOSPITAL

D A ORTH F MUELLER and E D Nora Bone and joint tuberculosis tuberculous peritonitis Rollier treat ment.

I L Servace Spivack s gastrostomy valve operation L A Macaluso Cystocele rectocele and hysterectomy

COOK COUNTY HOSPITAL

R W McNealy Manuel Lichtenstein Frederick TICE REPARCH I JAFFE and M J HUEBY Sym posum Diseases of the gall bladder, operations V L Schrader and B J Fitzceralt Operations George Appelbach and H Voris Operations

R T VAUGHAN and H BAKER Operations MARSHALL DAVISON and L. J. ARIES Operations
EDWIN M. MILLER and EDGAR TURNER Symposium

Children s surgery with operative clinic Members of the surgical staff will give demonstrations

in surgical technique upon cadavers and dogs in the laboratories of the Graduate School of Medicine 427 S Honore Street M LICHTENSTEIN Cadaver demonstra tion of some principles in gall bladder surgery

EVANSTON HOSPITAL

Symposium Surgery of Colon and Rectum

L D SVORF Diagnosis E R CROWDER Roentgenology

E L BENJAMIN Pathology FREDERICK CHRISTOPHER Surgery W R PARKES Prognosis in malignancy

GRANT HOSPITAL

SYLVAN COOMES and GEORGE APPLIBACH Operations and demonstration of cases

HOLY CROSS HOSPITAL

CHARLES M McKenna Cholecystectomy hermorrhaphy J DYBALSKI Open reduction of fracture of femur F KRAFT Hysterectomy, permeorrhaphy

I SALETTA Hysterectomy permeorrhaphy operation for shortening round ligament

M STRIKOL Appendectomy, hermorrhaphy

A RAKAUSKAS Appendectomy R LAWLER Cholecystectomy

IACKSON PARK HOSPITAL

ARRIE BAMBERGER Pre and postoperative treatment of surgical cases C C CLARK and H HOYT COX Operations

LUTHERAN DEACONESS HOSPITAL George O Solem Surgical indications in peptic ulcer

MOTHER CABRINI HOSPITAL

FUGENE J CHESROW ALBERT J CHESROW, E. P. OLIVIERI and N. V. EMANUELE Operations and demonstrations Obstructive cholecystitis due to constricting bands of adhesions in a child 5 years old, use of papain in post operative adhesions

MOUNT SINAL HOSPITAL

E I Greene Anaerobic hemolytic streptococcus infec tion (Meleney's disease)
JACOB M MORA Thyroidectomy in the aged
D WILLIS Removal of foreign (metallic) bodies from

tissues with aid of a new instrument

M GREENE Acute intestinal obstruction TRACE Postoperative pulmonary complications with

special reference to massive pulmonary collapse M L ARKIN The surgical diabetic

L EDDIN and N I Fox Medicosurgical discussion L Feldman Streptococcic bacteriemia precipitated by surgical procedures

POSTGRADUATE HOSPITAL

EMIL RIES Emsacro iliac lipomas with backache

PRESBYTERIAN HOSPITAL V C DAVID, KELLOGG SPEED C B DAVIS DR GATE WOOD L M MILLER, A H MONTGOMERY and asso ciates Operations

MICHAEL REESE HOSPITAL M L PARKER LEO ZIMMERMAN and SAMUEL GOLDBERG

Operations B PORTIS Thyroid surgery SAMUEL PERLOW Peripherovascular surgery

A A STRAUSS S STRAUSS and J PATEIDL Gastro intes tinal surgery

RALPH B BETTMAN and WILLIAM TANAPABALM Gall bladder operations

Dry Clinic Surgery of the Gall Bladder SAMUEL SOSKIN Preparation of the liver for surgery R A ARE'S The technique of cholecystography

A M SERBY, S TORTIS and G LICHTENSTEIN The evalu ation of liver function tests, gall bladder diet, survey of

postoperative results of the gall bladder group
RALPH B BETTMAN, LEO ZIMMERMAN and WILLIAM TAN NENBAUM Motion picture and diagrammatic demon strations The technique of cholecystectomy, choledochostomy, choledochogastrostomy or enterostomy

RESEARCH AND EDUCATIONAL HOSPITALS W H COLE Thyroidectomy, operation for pyloric

obstruction P I SARMA and H L MISHAIN Clinic on varicose veins

Symposium Diseases of the Thyroid W H COLE Pre operative care and postoperative com plications

L SEED and R BRUNNER Blood pressure studies during

thyroidectomy M Mora Hepatic damage in hyperthyroidism

R W KEETON Cardiac complications of hyperthyroidism JOHN HOME The thyroid gland as observed at autopsy in patients with diseases other than hyperthyroidism C B Puesrow Use of silk in thyroidectomy

ST ANNE'S HOSPITAL

THOMAS E MEANY Multiple fractures of leg including impaction of tibia into knee joint, fracture through the acetabular cavity dislocation of hip, fracture of hum erus, new method for ambulatory traction of fractured femurs in children, tendon transplantation of paralytic club foot and correction Paget's disease treatment, one treated eighteen months, one two months, the other one

JOHN L KNAPP and JOHN W LEANE Pylonic obstruction -child 22 days old, child 28 days old, patient 76 years old, patient 43 years old, diverticulities 3 cases George F Thompson Carcinoma of the gastro intestinal

tract, biliary tract, breast

ST ANTHONY DE PADUA HOSPITAL

S E DONLON and H P SULLIVAN Operations and demonstration of cases

ST BERNARD'S HOSPITAL

J M MAHONEY Infective granuloma of the cecum simulating a neoplasm demonstration of case HERMAN DEFEO Medical management of cholecystic disease

B C Cushway and associates Roentgen studies of gall bladder diseases

S L GOVERNALE Cholecystotomy vs cholecys
CHESTER C GUY Pathology of the gall bladder Cholecystotomy vs cholecystectomy

ST LUKE'S HOSPITAL

S W McARTHUR and associates Symposium Surgical conditions of the gall hladder and common duct
L L JENKINSON A ray diagnosis

GRANT LAING Pre operative and postoperative care S W McArthur Operative indications, type of pro cedure with some technical details

SOUTH SHORE HOSPITAL AXEL WERELIUS Biliary tract surgery

U S MARINE HOSPITAL

O I \ADFAL Results in hernia surgery E C LITTO and R W FLYN Spinal anesthesia

WESLEY MEMORIAL HOSPITAL

WILLIAM MILLER and WILLIAM A LOEPPERT Review of gall bladder surgery at Wesley during past 25 years

FRANCES E WILLARD HOSPITAL VICTOR L SCHRAGER, Chrisc.

NOVIEN AND CHILDREN'S HOSPITAL

WOVIEN AND CHILDREN'S HOSPITAL

PEARL M STETLER and CLEMENTINE FRANKOWSKI. Gen
eral surgery and gynecology

Il ednesday Afternoon COLUMBUS HOSPITAL

E D Nora and Thomas A Carter Pathological demonstration Thomas A Cartea Gotter surgery

D A ORTH C J SCHERIBEL and E D NORA Expen mental thyrotoxicosis

EVANSTON HOSPITAL

JAMES GRIER. Common bile duct obstructions

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I PARKELL Undescended testicies

MICHAEL REESE HOSPITAL

SAMUEL PERLOW Paravertebral alcohol injection for the relief of cardiac pain Leo Zimmerman and Otto Saprin Berngt tumors of the

thyroid gland
SAMTEL GOLDBERG Acute mesenteric lymphademitis
strangulated hermas in premature infants

THOMAS J MERAR Rectal complications of lymphogranuloma inguinale

CASPER EPSTEIN Fractures of the jaws VI L PARKER Carcinoma of the large bowel

ST ANNES HOSPITAL
HARRY J Dooley Malignancy of kidney and bladder
urnary calcult and kidney stone lantern slide degron

stration
JOEN J GENRY Ruptured gastric ulcer complicated by
acute ileus postoperative ruptured gastric ulcer complicated by acute appendicitis fracture of tibra and fibula

demonstrating walking caliber

E P GRAMER Repair of six herma cases with fascia lata
demonstration of abnormal cases of herma
HARRY M PYTERSON Emergency surgery demonstration
of ruptured stomach and ileus ruptured appendix

WESLEY MEMORIAL HOSPITAL

GUY S VAN ALSTANE Abdominal surgery Rationalization of pre- and postoperative treatment.

FRANCES E WILLARD HOSPITAL LOUIS F PLZAK CLINIC

Thursday Morning
AUGUSTANA HOSPITAL

N I PERCY Operations

ALBERT MERRITT BILLINGS HOSPITAL

D B PHEMISTER L R DRAGSTEDT \ BRE\SCHWIG W E \Daws and associates Operations

CHICAGO NEWORIAL HOSPITAL
PETER S CLARK LEO M ZIMMERMAN and M L WEIN
STEIN Gall bladder surgery

COOK COUNTY HOSPITAL

GEORGE DAVIS OPERATIONS
A H MONTGOMERY and F II STRAUS OPERATIONS.
WAN THOREM AND PHILLIP THOREM OPERATIONS.

RICHARD H JAFFE. Pathological conference.

Symposium Diseases of the Thyroid Gland

MARSHALL DAVISON and L. J. ARIES. Multiple stage

operations in poor n 1 patients the lallacy of post operations in poor not patients the lallacy of post operative iodine.

LINDON SEED Postoperative complications.
C.C. Master. The heart in thyrotomicosis.
W.O. Thompson: Factors influencing operative mortality.

in thyrotoxicosis.

S G Taylor III Pre-operative preparation

I L. Servack Surgical anatomy of the neck cadaver

demonstration
Members of the surgical staff will give demon trations
in surgical technique upon cadavers and dogs in the labora
tories of the Graduate School of Vledicine 427 S. Honore
Street.

EVANGELICAL DEACONESS HOSPITAL

JOHN L PERL Stomach resection

GRANT HOSPITAL

KARLA MEYER and Dr. ABELIO Operations and demon

stration of cases

IIOL\ CROSS HOSPITAL

J Francis Ruzic Choledochotomy and dilatation of common duct varinal hysterectomy cholecystectomy

J FRANCIS RUZIC D DICTRORNO WALTER EISEN Resection of superior hypogastric ganglion
FRANCIS STREYSMAN VARIOCCELECTORY

Simon airis Pelvic laparotomy inguinal oblique her morrhaphy

J KADTENICK. Cholecystectomy

ILLINOIS MASONIC HOSPITAL
CHARLES H. PARKES CARL F. STEINHOFF and WARREN

E Pros Surgical diabetes Organization of theservice, review of cases for past ten years treatment, protamine insulin anesthesia operative and postoperative cases.

JOHN R HARCE2 and J WALTER JOHNSON Gall bladder

urgery case history taking evaluation of tests, oper ative technique advantages of peridural anesthesia

JACKSON PARK HOSPITAL
George M Lucas Operations.

LUTHERAN DEACONESS HOSPITAL

JOHN D KOCKN G H VARMEN and GEORGE H.

SCHROEDER OPERATIONS.

MERCI HOSPITAL

T Jos Surgical anatomy of thyroid gland
R S BEACHOFF Cardiac complications in goiter
C F SCHAUB Ophthalmic and laryngeal complications of
goiter

L D MOORHEAD and K KLOCHER Surgical treatment of gotter

VORWEGIAN AMERICAN HOSPITAL

M E Lichtenstern Fractures and infections of the hand.

D F RUNKEN Operative genito-unnary clinic clinical conference electrical resection of the prostate

PASSAVANT MEMORIAL HOSPITAL
Symposium Diseases of the Fudocrine Gland

Symposium Diseases of the Endocrine Gland
HEANN VI POWRENZE Relationship of vitamin A to
thyroid disease

RICHARD D WEBER Effect of unsaturated fatty acids on

thyroid hyperplasia E LEARNS, IR Discussion of exophthalmos in thyroid

MARGARETE M KUNDL Pituitary obesity PAUL STARE Review of bio-assay procedures in chinical

endocripolom

PRESBYTERIAN HOSPITAL

V C DAVID C B DAVIS, WILLIAM MILLER and asso ciates Operations Dry Clinic

KELLOGG Speen Incisional hernia treated by massive fascial transplant

DR GATEWOOD Gastrojejunal ulcer ALBERT H MONTGOMERY Appendicitis in children

FRANCIS STRAUS Echinococcus disease of liver

H OBERHELMAN Fibrocystic disease and carcinoma of breast

Louis A Rosi Experimental vaccination of the pen toneum FEANL V THEIS Scalenus anticus syndrome and cervical

ribs demonstration of cases STANLEY LAWTON Malignancies of the breast in children

MICHAEL REESE HOSPITAL

A A STRAUSS and S STRAUSS Gastro intestinal surgery D C STRAUS General surgery

Thyroid Symposium D C STRALS Group study and demonstration of thyroid records, surgical management of hyperthyroidism S Soskin The endocrine disturbance in thy roid disease

L N KATZ Disturbed physiology of the cardiovascular system in thyroid disease M LEV Some clinical aspects of the heart in hyper

thyroidism medical management of hyperthyroidism A S Bouning and L \ Katz The electrocardiogram in thyroid disease

W W HAMBURGER Arrhythmias in thyroid disease B Portis Outpatient clinic management of hyperthy roidism

B Portis and H Rots Treatment of hyperthyroidism complicated by pregnancy and syphilis

R LEVINE Experimental treatment of hyperthyroidism RESEARCH AND EDUCATIONAL HOSPITALS

C B Puestow Operations Choledochostomy carcino ma of rectum

Symposium Gall Bladder Diseases C B Presrow The effect of cholecystectomy on pressure in the choledochus gall bladder fistulæ

EDMUND FOLEY Differential diagnosis between intra hepatic and extrahepatic jaundice W H COLE The role of cystic duct obstruction in gall

bladder disease A HARTUNG The advantage of combining gastro intes tinal series with cholecystography

ST ANTHONY DE PADUA HOSPITAL

F B OLENTINE Operations and demonstration of goiter and abdominal surgery cases

ST JOSEPH'S HOSPITAL

WILLIAM C BECK Thoracic surgery ARCHIBALD HOYNE Control of contagion in surgical dis

WILLIAM H G LOGAN Oral surger FRANKLIN B McCARTY Gall bladder surgery CHARLES VI VICKENIA Undescended testicle HLGH Mckenna Fractures, conservative surgery in dia betic gangrene

I RANK THEIS Peripheral circulatory diseases Pathological and radiological material illustrating the

above will be presented by LAWRENCE HINES pathologist and WILLIAM F ANSPACH, radiologist

ST LUKE'S HOSPITAL

F L McMillan Tumors of the colon H E Mock Infected granuloma, gall bladder disease A R Morrow Acute surgical abdomen

C E SHANNON Acute and chronic pancreatitis IOHN LINDQUIST Appendicitis

JOHN PRIBBLE Avillary abscess

ST MARY OF NAZARETH HOSPITAL T LARKOWSKI Symposium Hermas and their repair I C HILL Discussion of pathologic operative findings VETERANS ADMINISTRATION FACILITY

PAUL F BROWN BENJAMIN F WARD JOSEPH E BARSS and MERRILL H JUDD Operations

WESLEY MUMORIAL HOSPITAL

GUY S VAN ALSTYNE and FRANK L HUSSEY Manage ment of breast tumors, comparative results in radical treatment of breast carcinoma with and without supple mentary x ray therapy
W McNealy, R F Hedin and E R STRAUSER

Surgery of jaundiced patients

FRANCES E WILLARD HOSPITAL

A E STEWART Clinic

WOMEN AND CHILDREN'S HOSPITAL PEARL M STETLER and MARIE ORTMAYER Gall bladder

surgery in diabetics MARIE ORTHAYER The gastroscope and its indicated use ALICE CONLIN Thyroidectomy

ESTHER RAHN Repair of ventral hernia

Thursday Afternoon CHICAGO MENORIAL HOSPITAL

BENNETT R PARLER LEO M ZIMMERMAN WALTER S PRIEST and OTTO SAPHIR Symposium Thyroid disease FRANK WRIGHT, ALBERT ZRUNEK LEO M ZIMMERHAN, M L WEINSTEIN and OTTO SAPRIR Symposium Blood transfusion

COOK COUNTY HOSPITAL

RALPH BETTMAN and W A POTTS Operations E J LEWIS and E LATIMER Operations HOLY CROSS HOSPITAL

FRANCIS RUZIC Biliary tract surgery F M PHIFER and G A INGRISH Renal surgery

MICHAEL REESE HOSPITAL

Symposium Gastro Intestinal Surgery LEON BLOCH The medical treatment of ulcerative colitis A A STRAUSS The surgical management of ulcerative

colitis S STRAUSS The use of ileostomy in ulcerative colitis and carcinoma of the colon

OTTO SAPHIR Pathology of ulcerative colitis Discussion R ARENS X ray diagnosis of ulcerative colitis and peptic

ulcer Discussion H Necheles Physiology and pharmacology of peptic ulcer and ulcerative colitis

A A STRAUSS and H F BINSWANGER Medical and surgical treatment of terminal ileitis

ST ANTHONY DE PADUA HOSPITAL W H BRADLEY Operations

ST BERNARDS HOSPITAL

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W. S. HECTOR and S. S. DUBOVA. Imperforate anus with atrena of large bowel.

ST FRANCIS HOSPITAL

STAFF Symposium Pre-operative and po-toperative care including diet fluid requirements, oxygen requirement., blood transfu ion pulmonary complications thrombosis and philebitis methods of decompression

ST LUKES HOSPITAL

H E JONES Reconstruction of the common duct, Lee Strong. Appendicutes

ST MARY OF NAZARETH HOSPITAL

P CENALINSET Surgical incl.ions.
A PARTIPILO Assphic gastro intestinal anastomosi du
odenal ileus motion picture demon tration.

F TENCEAR Abdominal operations JOHN TENCEAR and J C HILL Operations

WESLEY MEMORIAL HOSPITAL
HAVDEN & E. BARNARD Cholecy tography from surpeal

ORMAN PARRY Mesentene lymphadenitis

FRANCES E WILLARD HOSPITAL OTIS M WALTER Climic

WOMEN AND CHILDREN'S HOSPITAL

EMELIA GIRNOTAS Cholecystectomy hysterectomy
opphorectomy

Friday Morning

ALBERT MERRITT BILLINGS HOSPITAL

D B PREMISTER L R DEAGSTEDT A BETNICHMIN

W F ADMIS and as occurs Operations

Ymposium Surgery and the Circulation
H Liven's rove Anesthesia and the circulation
N Rooke H. Wilson H. H. Hakerys and D. B.
PRIMITER Causes and treatment of surgical shock
W. E. Anus. Intrathoraccoperations and the circulation
Kerim Gainson. Effects of partial and total ympa
theotomy on blood pressure.

COLCUBES HOSPITAL

M J Seiffer and F \ O Malley Gastro-intestinal surgery
F Voltri Histidine treatment.

COOK COUNTY HOSPITAL VERNON C DAVID and Make LURING Symposium Surserv of the large bowel

gery of the large bowel
FREDERICK G DA ASAND RICHARD WATTHIES Symposium
Pentonitis with operative clinic
R C SCLUTAN and V T FRANCOVA Operations

R C SCLINAN and \ T FRANCONA Operation GEORGE AFFELBACH and H. VORIS Operations. \ C DAVID and MARK LORING Operations LINDON SEED Operations

H JACESON and PRILIP SHAFERO Operations.

F J JERA and C SCUDERI Operations.

J D KOLCKY Operations.

Members of the surgical taff will give demon-trations in

surgical technique upon cadavers and dogs in the laboratories of the Graduate School of Medicine 427 S. Honore Street. J. L. Sen 402. Galtro-enterostomy

GRANT HOSPITAL

SYLVAN COOMES LINDON SEED and 4. G ZIMMERMAN Operations and demon tration of cases.

HOLY CROSS HOSPITAL

FRANK FRAMER and MCHOLAS PAVLETIC Hysterectomy cesarran section cholecys ectomy
SII PHEN BIEZIS. Cholecystectomy hysterectomy repair

of inci ional herma.

FEIR WASSET AS Inguinal hermorrhaphy
JAMES GALLAGHER, Cholecystectomy

WHITAN REILLY Cholesystectomy and appendectomy

I J BADEMIEROWSKI and H. IRACE. HYSTERECTOMY

JACKSON PARK HOSPITAL

A BANNERGE H. H. CON and C. C. CLARK, Operations
LUTHERAN DEACONESS HOSPITAL

TOTAL

T

JOHN D KOLCES G H. MAKKEN and GEORGE H. SCHROEDER Operations.

George O Solesi Surgical indications in peptical or MOUNT SINAI HOSPITAL

1 A STRAUSS, S. F. STRAUSS and B. SAVEL. Operation...
M. LEWISON. Surgery in cardiovascular diseases.

II J Isaacs Coronary disease imulating act te abdominal cata_trophies.

E B Faction Surgery in tuberculosis.

I Davidsons Clinical pathological conference.
POSTCRADUATE HOSPITAL

L ZDONERALA Vancose veins and their complications.
PRESBYTERIAN HOSPITAL

C DAVID KULLOG SPEED C. B DAVIS, Dr. GAIL WOOD WHILLIAN VINLEY and A. H. VONTONERY OPERATIONS.

MICHAEL REESE HOSPITAL

J PATEJDL, P SHAPING R. CRAWFORD B PORTIS, S GOLDBERG M L PARKER and LEO ZEGUTELAN OPER SUONS. RESEARCH AND EDUCATIONAL HOSPITUS

R B Malcolm. Operative clinic Neck dissection carn noma of breat surgical pathology of breast tumors.

Clinical Demon tration.

T J NACHONSET \ Tax treatment of carenoms of the brea t.
GEORGE DETARAGNET Hemangiomas

TRRIE BAMBIRGER EWING TURNOF With case report.
C. L. Brace. Indications for plenectomy
W. H. Colle. Acute parcreatitis.

ST ANTHON; DE PADUA HOSITTAL

J J SPRANKA. Abdominal surgery and demonstration.

J J SPRAIRA. Abdominal curgery and demonstrates
ST ELIZABETH'S HOSPITAL

F D KALTELAGE. Thyroid disease

ST LUKE'S HOSPITAL Staff clinic, including papers, discussion and pathol mod

demon trations
SOUTH SHORE HOSPITAL

GUNS VAN ALSTING. Aseptic bowel resection.

J D KIRSHBAUM. Pathological demon.tration.

Friday Afternoon COOK COUNTY HOSPITAL

COOK COUNTY HOSPITAL

J G FROST and J M ROBERTS, Operations,
SCHONER L KOCH and J J LEBOWITZ, Symposium Hand

infections with operative clinic.

E. Warszewski and P. Czwalinski. Operations.

HOLY CROSS HOSPITAL CHARLES GALANTI. O-teogenic sarcoma.

EMIL WELS. Splenomerals

ILLINOIS MASONIC HOSPITAL

CHARLES DRUECK and H E OLIVER Pruritis am cases due to systemic disturbances. Ovarian dysfunction (vi carious pruritus), hypothyroidism, spastic colon, obesity

JACKSON PARK HOSPITAL

HARRY E L TIMM Operations

MOUNT SINAI HOSPITAL

I DAVIDSOHN Differential diagnosis of infectious mono nucleosis simulating surgical conditions, demonstration ol technique

RESEARCH AND EDUCATIONAL HOSPITALS Symposium Diseases of the Gastro Intestinal Tract GEORGE MILLES Pathology of carcinoma of stomach

W H COLE Total gastrectomy

T J WACHOWSKI X ray diagnosis of carcinoma of stomach C L BIRCH Anemia associated with total gastrectomy

M H STREICHER Diagnosis of carcinoma of the rectum C B Puestow Surgical treatment of carcinoma of the BERNARD PORTIS Surgical treatment of complicated

duodenal ulcers F L McMillan Regional ileitis

I L Spryack Tubovalvular stoma wi h particular reference to gastrostomy

H O WERNICKE The injection treatment of hernias

ST ELIZABETH'S HOSPITAL J K NARAT Pre and postoperative intravenous admin

istration of fat emulsion

GYNECOLOGY AND OBSTETRICS

Monday Afternoon

CHICAGO LYING IN HOSPITAL Symposium Puerperal and Nonpuerperal Genital Infections

F L Apara Bacterial and antitoxic value of pyridium in urinary infections I Brown Eacteriology of abdominal operations

R E Arnell Gynecologic pelvic heat therapy (Elliott)
P W WOODRUFF Importance and treatment of oral and vaginal mycosis, prevention of infection in newborn—skin, mouth and cord
LUCILE HAC Sulfanilamide laboratory report

H C HESSELTINE Sulfanilamide therapy

Motion picture, Normal Labor " COOK COUNTY HOSPITAL

FREDERICA H FALLS Gynecological operations A F LASH Puerperal sepsis ward walk HOLY CROSS HOSPITAL

PAUL LAWLER Application of obstetrical forceps (manikin demonstration)

ST LUKES HOSPITAL

OBSTETRICAL STAFF Ward walk

WOMEN AND CHILDREN'S HOSPITAL ANNIE E BLOUAT Gynecological operations Pyosalping ovarian tumor exhibition of 75 pound tumor

Tuesday Morning

CHICAGO LYING IN HOSPITAL Fred L Adair, William J Diecaman, M Edward Davis, H C Hesseltine, Carl P Huber, R E ARNELL and staff Operations and demonstration of

COOK COUNTY HOSPITAL

CAREY CULBERTSON and P H VANVERST Gynecological

operations
A E KANTER Gynecological operations
D S HILLIS Ward walk, treatment of abortion

GRANT HOSPITAL

W A STURR, E W FISCHMANN and FREDERICK H FALLS Operations and demonstration of cases

PRESBYTERIAN HOSPITAL N S HEANEY CAREY CULBERTSON, A E KANTER E D ALLEN and H BOYSEN Operations

MICHAEL REESE HOSPITAL

J L BAER, J E LACKNER, WILLIAM RUBOVITS, I F STEIN and RALPH REIS Gynecological operations JOSEPH L BAER Ward rounds WILLIAM RUBOVITS Ward rounds

ST LUKE'S HOSPITAL

H O Jones and associates Demonstration clinic W T Carlisle Endometrial studies ELGENE CARY Treatment of occupitoposterior

WESLEY MEMORIAL HOSPITAL

MARK T GOLDSTINE, R A MASESSA, M J DICOLA and W J JEFFRIES Uterine bleeding

FRANCES E WILLARD HOSPITAL ASCHER H GOLDFINE Clinic

WOMEN AND CHILDREN'S HOSPITAL MARY EDITH WILLIAMS Removal of abdominal tumors OTILLIE ZELEZNY Electrocoagulation of the cervix uteri

> Tuesday Afternoon CHICAGO LYING IN HOSPITAL

Symposium Toxemias of Pregnancy

W J DIECEMANN Summary of five years' study P W WOODRUFF Cold water test in pregnancy R E ARNELL Vascular collapse

RUTH M WATTS Quantitative determinations of prolan and estrin in toxemia EDITH L POTTER Pathology of toremias of the mother

and newborn

COOK COUNTY HOSPITAL

J P GREENHILL Gynecological operations RUDOLPH and J H BLOOMFIELD Symposium The toxemias of pregnancy

PASSAVANT MEMORIAL HOSPITAL ARTHUR H CURTIS and GEORGE H GARDNER Operative and demonstration clinic

ST ELIZABETH'S HOSPITAL J R LAVIERI Cesarean section

FRANCIS E WILLARD HOSPITAL ASCHER H GOLDFINE Chinic

WOMEN AND CHILDREN'S HOSPITAL ELOISE PARSONS Vaganal hysterectomy and sterilization Wednesdon Morning
CHICAGO LING IN HOSPITAL

FRED L DAIR WILLIAM J DIFFERMAN W EDWARD
DAYS H C HESSELTIN CARL P HEBER R E
ARKEL AND STAN (SET)

COOK COUNTY HOSPITAL

C. W. BARRETT and R. BARRETT Gymecological opera.

J E FITZGERALD Demonstration Ward walk heart

disease in pregnancy

J P GREENHIL C W BARRETT W T CARLINE EGON

W FISCHMANN FREDERICA H FALLS A E KANTER
and CARRY CLIBERTSON Symposium Fibroids

EVANGELICAL DEACONESS HOSPITAL
A J SCHOENBERG Hysterectomy

GRANT HOSPITAL

W 4 STLER E W FISCHMANN and FREDERICK H. FALES.
Operations and demonstration of cases

HI NROTIN HOSPITAL

E. L. CORNELL I command that the Milliam M. Hankanan Comparison of various analge sias in labor.

F LEF STONE Sterility in the female CHANNE W BARRETT Anatomy of pelvic floor RUSSELL BARRETT Immediate repair of faceration

JACKSON PARK HOSPITAL
CHARLES F GREENE LOUIS H STERN W J NIXON
DAYS JR REND NORMAN ZOLLA Treatment of con
tracted pelves by cesarean section version and forceps

NORWEGIAN AMERICAN HOSPITAL
P SAMPLE Cynecological operations

I ASSALANT MEMORIAL HOSTITAL
GEORGE H & ARDER and ARTHUR H CERTIS Gyneco
logical pathology—demonstration and conference

I RESBYTLRI V HOSPITAL Dry Clinic

A E KANTER Changes in the upper urinary tract due to certain pelvic masses EDWARD ALLEN Diagnosis and treatment of early ectopic

EDWARD ALLEN Diagnosis and treatment of early ectops pregnancy trichomonas vaginalis FRED O PRIEST Hormone producing tumors

N SPROAT HEANEY Naginal hysterectomy and endome triosis motion picture demonstration

CAREY CLIBERTSON Gross and microscopic demonstra

tion of gynecological specimens
RESEARCH AND EDUCATIONAL HOSPITALS

FREDERICK H FALLS Eclamptogenic toweris low cersical cesarran section under local anesthesia
W. H. Browne. Progestin in the treatment of abortion
G. H. REZER. Modification of the Friedmann reaction.

MICHAEL RETSE HOSPITAL
JOSEPH L BAER Ward rounds
WILLIAM REBOVITS Ward rounds

JOSEPH L BARR Shifting trends in the treatment of prolapse of the uterus

JULIUS E LACKNER Recent investigations in the action of progesterone

WHILAM RUBOVITS Postoperative vaging antisepsis IRVING F STEIN Evaluation of the safe period RALPH A REIS Mammography LESTER I FRANKENTHAL, JR Treatment of valvoraginus.

MICHAEL L LEVENTHAL. The Manchester operation for
the current cyclocele and prolapse.

HENRY BUYSHUM. The role of spermotorin in temporary.

sternity

1 F Lasu Carly diagnosis of carcinoma of the uterus.

ST LUKE S HOSPITAL

GEORGE C Frolk Blood cal sum during pregnancy

GEORGE C FINOLA. Blood cal sum during pregnancy JAMES A GOLGE Chorronepithelioma

NASHINGTON ROULES ARD HOSPITAL

WASHINGTON BOULFVARD HOSPITAL
PART C Fox Sterility
WESLEY MENORIAL HOSPITAL

CHARLES B REED WILLIAM B SERBIN and C C RICHARD-SON Moving picture demonstration of low forces, breech extraction with forceps on aftercoming head spontaneous breech—manual aid

WOMEN AND CHILDREN'S HOSPITAL MAY SPINACE Pelvic mensuration in prenatal care FLORENCE HASE. Prenatal care with reference to the bab. RUBLE DARROW Treatment of letterus gravie BRITHE A SCHOOSEN. Maternal mortality.

II ednesday Ifternoon
CHICAGO LYNG IN HOSPITAL
Symposium Obstetric Hemorrhage and Trauma of
Voother and Fetus and Their Sequels
II C HESSELPTE hasheny and physioleys of the pelik

floor in relation to central prolapse

VEDWARD DAVIS | athology and treatment of placents

organia

W J DIECEMAN Rôle of blood transfusion in obstetic bemorrhage C P Huber Duhrssen's incisions epistotomy repair of

CETVER and perineum
G T Burns Uterine rupture
C J Newcown I revention and treatment of postpartum
hemorrhage

Wotton picture Hemorrhage Tran fusion etc
CHICACO MEMORIAI HOSPITAL
LALL WICKNEY JULIA C STRAWN HARRY L MENERS

B E TECERA AND WILLIAM F HENTT GEORGE V
SCHETT AND HARRY BEVARD CESTEAN COUNTY HOSPITAL

COOK COUNTY HOSPITAL

W T Carliste and C Gener. Gynecological operations
RESE RICH AND EDUCATION AL HOSPITALS
FREDERICA. II FALIS and staff. Operations. Symposium
Gynecological tumors
FREDERICK. II FALIS. Vulva cartinoma demonstration
of cases vulvectomy under local anesthesia.

R A LIFVE-DAHL. Solid tumors of ovary
L STOVE Removal of ovarian cyst.

II H HHLL Early carcinoma of cervix

WOMEN AND CHILDREN'S HOSPITAL
CONSTANCE O'BRITIS GYNCCOLOGICAL OPERATIONS
BERTIAL VA PROSESS AND MATCHE HALL WENTER
thesia in obstetics
BERTIAL VE TOCKER
PRINCIPLE TOCKER
PRINC

BEATRICE E TECKER Parasacral ane-thesia

Thursday Morning
CHICAGO LYING IN HOPPITAL
FRED L ADUR WILLIAM J DIECKMANN M EDWARD
DAVIS H C HESSELTIVE CARL P HOBER R. E.

DAVIS H C HESSELTINE CARL P HUBER R. E.
ARNELL and staff Operations and demonstration of
cases

CHICAGO MENORIAL HOSPITAL

PAUL M CLIVER JULIA C STRAWN, HARRY L MEYERS BEATRICE E TUCKER and WALTER WIBORG Sympo sum The treatment of prolapse of the uterus, cystocele and rectocele at various ages

JAMES E PITZGERALD, WILLIAM F HEWITT, GEORGE N Scinff and HARRY BENARON Indications and technique for cesarear section nerve block in obstetrics

COLUMBUS HOSPITAL

C W BARRETT and R BARRETT Gynecological chinic COOK COUNTY HOSPITAL

EGON W FISCHMANN and W J REIGH Gynecological operations

L FITZGERALD and L RUDOLPH Symposium Ectopic pregnancy its diagnosis and treatment

GRANT HOSPITAL

W A STURR L W FISCHMANN and PRIPERICK H FALLS Operations and demonstration of cases

ILLINOIS MASONIC HOSPITAL

HAROLD W MILLER, WALTER C BORNEMEIER and GLENN NELSON Breast tumors—early diagnosis demonstration of cases Operative Uterine fibroid differential diagnosis, demonstration of peritoneoscope

FREDERICA O BOWE, BEULAH WALLIN and JOHN H GILMORE Cesarean section Indications comparison of results in different types, demonstration of operative technique of low cesarean section extra uterine preg nancy, frequency diagnosis complications and treatment

MOUNT SINAI HOSPITAL

A H KLAWANS Endometriosis
λ E KANTER Masculinizing tumors of ovary
A Γ LASH Pelvic infections

A H E GOLDFINE, C NEWBERGER, H BUNBAUM and

associates Symposium Obstetrical hemorrhages
L RUDOLPH Physiological and clinical aspect of occipito posterior position
A Arkin I \ Rabevs and R Gordon Medicosurgical

discussion

PRESBYTERIAN HOSPITAL

N S HEANEY, CAREY CULBERTSON, A E KANTER, E D ALLEN and H BOYSEN Operations

MICHAEL REEST HOSPITAL

JOSEPH L BAER Ward rounds WILLIAM RUBOVITS Ward rounds

ST ANTHONY DE PADUA HOSPITAL M A WEISSLOPF Operations

ST LUKE'S HOSPITAL

H K Gibsov The late toxemias of pregnancy

SOUTH SHORE HOSPITAL

ANDREW DAHLBERG The management of occipitoposterior position

WESLEY MEMORIAL HOSPITAL MARL T GOLDSTINE R A MASESSA, M J DICOLA and W G JEFFRIES Vaginal plastics

Thursday Afternoon

CHICAGO LYING IN HOSPITAL Symposium Obstetric and Gynecologic Pathology NEWCOMB Malignancy of the vulva F L ADAIR Treatment of genital malignancy cases

EDITH L POTTER Pathologic lesions peculiar to fetus and

M E Davis Pathology and treatment of uterine fibromyomata

RUTH M WATTS Endocrinologic study of ovarian cysts M W BOYNTON Pathology and treatment of hydatidiform mole and chorronepsthelioma Motion picture "Colpocleisis"

COOK COUNTY HOSPITAL

FREDERICK H FALLS Gynecological operations J H BLOOMFIELD and D S HILLIS Symposium Late hemorrhages of pregnancy

PASSAVANT MEMORIAL HOSPITAL

ARTHUR H CURTIS and GEORGE H GARDNER Operative and demonstration clinic

ST BERNARD'S HOSPITAL

E A RACH and T J STUCKER Cesarean section S S SCHOCHET Fibroids

H B HAEBERLIN Hysterectomy and its indications ST MARY OF NAZARETH HOSPITAL

L KOZAKIEWICZ and M UZNANSKI Recent advances in toxemias of pregnancy

H LITTLE, GEORGE MUELLER and I C HILL Ovarian tumors

Friday Morning CHICAGO LYING IN HOSPITAL

1 RED L ADAIR WILLIAM J DIECKMANN M I DWARD DAVIS, H C HESSELTINE CARL P HUBER, R E ARNELL and staff Operations and demonstration of cases

COOK COUNTY HOSPITAL

A E KANTER Gynecological operations CAREY CULBERTSON and P H VANVERST Gynecological operations

A I LASH Demonstration Ward walk toxemias of pregnancy

GRANT HOSPITAL

W A STUHR, E W FISCHMANN and FREDERICK H FALLS Operations and demonstration of cases

PRESBYTERIAN HOSPITAL

N S HEANEY, CAREY CULBERTSON, A E LANTER, E D ALLEN and H BOYSEN Operations

MICHAEL REESE HOSPITAL

J L BAER, J E LACKVER, WILLIAM RUBOVITS, I P STEIN and RALPH REIS Gynecological operations JOSEPH L BAER Ward rounds WILLIAM RUBOVITS Ward rounds

ST LUKE'S HOSPITAL

JAMES E l'ITZGERALD Heart disease in pregnancy WESLEY MEMORIAL HOSPITAL

B REED and W B SERBIN Ablatio placenta

G C RICHARDSON Placenta prævia

WOMEN AND CHILDREN'S HOSPITAL BERTHA VAN HOOSEY and MAUDE HALL WINNETT SUIGical cases complicating obstetrics

Friday Afternoon

CHICAGO LYING IN HOSPITAL Endocrines and Physiology of Female Genitalia M W Boynton Laboratory diagnosis of pregnancy A Prostroff Circulation of the placenta

SARAH A PEARL Studies on uterine motility C P HUBER Diagnosis of endocrine disorders VI E DAVIS Clinical treatment of endocrine disorders CHARLOTTE L CLANCY Contracention and stembeation Motion picture Cesarean Section '

COOK COUNTY HOSPITAL

L RUDOLPH Symposium Prolonged labor constriction ring dystocia

D S HILLS J H BLOOMFIELD and \ F LASH Demon stration and operations symposium Cesarean section

MERCY HOSPITAL

HENRY SCHMITZ HERBERT F. SCHMITZ HENRY L. SCHMITZ and P. A. NELSON Symposium on operative gynecology

ORTHOPEDIC SURGERY

Monday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS H B THOMAS F W HARR and C N LAMBERT Sym posium Tenodesis Operations and demonstration of cases tendon transplantation

ST LUKES HOSPITAL

F \ CHANDLER and JOHN R NORCROSS Spondylo listhesis asentic necrosis of the head of the femur

SHRINER S HOSPIT AL FOR CRIPPLED CHILDREN BEVERIDGE MOORE Boys ward walk

II A SorteLo Girls ward walk A DREHER Apparatus and special instruments

Tuesday Morning

CHILDREN'S MENIORIAL HOSPITAL

F CHANDLER F SEIDLER C PEASE and I NORCROSS Operations and demonstration of cases Sympathicoblas toma spondylolisthesis patellar sdvancement opera tion hip fusion Legg Perties disease extraperationeal obturator neurectomy congenital dislocation of hip, Pott s disease developmental snomalies cora valga

COOK COUNTY HOSPITAL

ARTHUR CONLEY and C. GUY. Operations and demonstra tion of cases Blind pegging of hip for fracture of neck of femur using Kirschner wire and Smith Petersen nail problems in diagnosis of bone tumors painful back in medico legal cases persistent dizziness following head mittres fractures in and about the ankle
MARCES II HOBART and I JANEY Demonstration with

operative clinic Removal of internal semilunar cartilage recurrent dislocations of the shoulder internal derange ment of the knee joint minal fu jons and low back pain acquired dislocations of hip following scarlet fever syndacty lism

PASSAVANT MEMORIAL HOSPITAL PHILIP H KREUSCHER and RICHARD I BENNETT IR

Spinal fusion Nicola operation for recurrent dislocation of shoulder osteochondritis of elbow joint osteochon dromatosis of hip joint

MICHAEL REESE HOSPITAL

PRILIP LEWIN DANIEL LEADNING CHARLES PEASE I GLASSMAN SIDNEY SIDEMAN JEROME G FINDER and I Worr Operations

RESPARCH AND EDUCATIONAL HOSPITALS FREDERICA H FALLS and staff Symposium Plastic operations with special reference to the use of local anesthesia FREDERICK IF FALLS Vaginal hysterectomy for proci

dentia under local anesthesia M I SUMMERVILLE Anterior colporrhaphy and interess

tion operation under local anesthesia

MILLIAM H BROWNE Sturmdorf Kelly incontinence oper atton and permeorrhaphy under local anesthesia

WOMEN AND CHILDREN'S HOSPITAL CATHERINE TRUE Abdominal gynecological cases Utenne

fibroids tumor of vagina Official Zelezvi Cervical lesions before and after treat

ment with electrocoagulation Exorse Parsons Treatment of eroded cervix by cautery treatment of sterility hysterosalpingography

ST LUKE S HOSPITAL

F A CHANDLER and JOHN R NORCROSS Chordotomy for chorse-athetosis spina bifida

SHRINER SHOSPITAL FOR CRIPPLED CHILDREN BEVERIDGE MOORE and H A SOFIELD Operations

Tuesday Afternoon

COLUMBUS HOSPITAL FREDERICA MUELLER E II SLOTT and I E SLOTT

Scratica MOUNT SIN M HOSPITAL

C Jacobs Orthopedic demonstrations
L VILLER Visus lization of joints
J FINDER Grant cell tumor of bone
F GLASSIAN Vonunion of neck of femur

PASSAVANT MEMORIAL HOSPITAL

EMIL HALSER and associates Surgery of the linee and foot-demonstration of cases and lantern slides Total tendon transplant for slipping patella injunes of the external semilunar cattilage loose body the result of a semilunar cartilage injury manipulative correction of deformity tendon transplant as a routine procedure to triple arthrodesis of the paralytic foot reconstruction operation for hallux valeus

PRESBYTFRIAN HOSPITAL

E | BERKHEISER KELLOGG SPEED D RIDER and WILLIS Ports Operations.

ST LUKES HOSPITAL H A SOFIELD Fracture of the neck of the femur treated

by steel pin method of fixation Lantern slides cases. W RYERSON Injuries and anomalies of the spine R O RITTER Fractures and infantile paralysis

WESLEY MEMORIAL HOSPITAL Bone and joint surgery diagnosis of FELIX JANSEN
shoulder lesions

HAMPAR KELIKIAN Fractures of the forearm.

Il ednesday Morning LUTHER AN DEACONESS HOSPITAL EMIL VETIAR Indications for surgical treatment of arthntis

ST LUKE'S HOSPITAL

E W RYERSON and associates Operations

Wednesday Afternoon EVANSTON HOSPITAL

I L PORTER and R C LONERGAN Low back disorders MARCUS HOBART Operative treatment of low back pain DWIGHT CLARK Fractures about the knee joint

MERCY HOSPITAL

L D CLARIDGE and J M LEOVARD Unusual problems in orthopedic and traumatic surgery

MUNICIPAL TUBERCULOSIS SANITARIUM

L I BERKHEISER and ISADORE ZAPOLSKY Demonstration in bone and joint tuberculosis

PRESBYTERIAN HOSPITAL

L J BERKHEISER KELLOGG SPEED D RIDER and WILLIS Ports Operations

MICHAEL RELSE HOSPITAL

PHILIP LEWIV Fracture problems new approach for arthrodesis of knee joint, discussion of bone tumors motion picture demonstration of manipulative surgery SIDNEY SIDEMAN Rice bodies in tendon sheath of the hand, Hoke stabilization of the foot spastic paralysis roentgenologic library of the hip joint, fusion operation in tuberculosis of the knee joint bunion operation. multiple cartilazinous exostosis

DANIEL H LEVINTHAL and IRVING WOLLY Tendon trans plantation in poliomyelitis spastic paralysis recurrent dislocation of shoulder, flat feet demonstration of arthroplasties of the knee, hip and elbow, knee joint

CHARLES PEASE Acute transverse atrophy of bone traumatic rupture of intervertebral disc, reduction of compression fracture of spine osteochondromatosis of the elbows

JEROME G FINDER Chondromyxosarcoma, two cases, flevorplasty of the thumb for paralytic opponens pol-licis osteochondroma of the tibia McBride bunion plasty, unusual bone tumor (2) of femur. Key operation for soft corns, spastic paralysis-bilateral adductor tenotomy and obturator nerve neurectomy, case with unusual deformaties

Frank Glassman Fracture and dislocation of shoulder, supracondylar fracture of the humerus, fracture of the neck of the femur complete fracture of the trbia and fibula removal of the head of the radius three cases, osteoma of the femur, demonstration of various types of fractures and treatment

ST ANTHONY DE PADUA HOSPITAL

THOMAS DWYER New bone biopsy trephine pathological specimens

ST LUKES HOSPITAL

H B THOMAS, FRED HARK and CLAUDE LAMBERT
Whitman's reconstruction of the hip good range of
motion Volkmann's contracture a plea for early treat ment echinococcus cyst of the os ilium chronic arthritis joints arthroplasty

SHRINER S HOSPITAL FOR CRIPPLED CHILDREN BEVERIDGE MOORE and LAWRENCE NOALL Congenital club feet treatment

\ Drener \ew types of braces

Thursday Morning ALBERT MERRITT BILLINGS HOSPITAL

Presentation on Bone and Joint Surgery

E L COMPERE Leg lengthening operation, technique and results, spinal fusion in the correction of scoliosis

C H HATCHER The pathology and treatment of tuber culous artbritis, studies in the rate of skeletal growth and equalization of limb length

P C Bucy and R B CLOWARD Spinal extradural cyst

and its relation to kyphosis dorsalis juvenilis C B Huggins Studies in the distribution of red bone

marrow and the reticuloendothelial system in the skeleton

H N HARKINS Bone graft for ununited fracture

COOK COUNTY HOSPITAL

PHILIP LEWIN and S SIDEMAN Demonstration and oper ative clinic Tunnel skin graft over os calcis, spondylolisthesis, stabilization of paralytic varus foot, arthrodesis of ankle joint, Hallux varus tuberculous spinefusion, infantile paralysis, low back pain with sciatica "

FRANK G MURPHY Demonstration Skin grafts for old wounds of leg unusual bone tumors, fracture into ankle joint, malunion of Colles' fracture, tuberculosis of cuneiform bone, scar contracture of forearm-skin graft DANIEL H LEVINTHAL and I WOLIN Demonstration

Motion pictures-surgical treatment of spastic paralysis. surgical treatment of residual paralysis following polio myelitis Operations Bone graft for nonunion, stabili zation, benign bone tumors
PHILLIP H REUSCHER and R T McDonald Demonstra

tion with operations Aicola operation, semilunar car tilage derangement spinal grafts, new operation for hip fusion new operation for knee fusion

MICHAEL REESE HOSPITAL

PHILIP LEWIN, DAVIEL LEVINTHAL, CHARLES PEASE. I GLASSMAY, I WOLLY, SIDVEY SIDEMAN and JEROME G FINDER Operations

5T BERNARD'S HOSPITAL

S L Governate Pseudomuscular dystrophy, case demonstration

J G FROST Metastatic hypernephroid carcinoma of the

CHESTER C GUY Surgical pathology of bone tumors

ST FRANCIS HOSPITAL

E B FOWLER Orthopedic and traumatic surgery ST LUKE'S HOSPITAL

E W RYERSON and associates Clinic

ST MARY OF NAZARETH HOSPITAL

I. Czaja Symposium Late results of fractures, clinic SHRINER'S HOSPITAL FOR CRIPPLED CHILDREN

BEVERINGE MOORE and H A SOFIELD Operations

VETERANS ADMINISTRATION FACILITY

S K LIVINGSTON, A T BARNETT and M J MURPHY Massive bone graft of femur, release of iliotibial band for severe sciatica

Thursday Afternoon COOK COUNTY HOSPITAL

F J BERKHEISER and F SHAPIRO Operative clinic with demonstration Spondylolisthesis, anterior poliomyelitis, arthrode is and tendon transplantation

ILLINOIS MASONIC HOSPITAL

CHARLES N PEALE and EDGAR WHITE Fractures about
the clow in children reduction of fractures of the spane
traumatic rupture of the intervertebral disc

PRESBYTERIAN HOSPITAL

KELIOGO SPFED Displared interestebral duc arthroplasty of elbon epiphysitis of upper end of femur tendoplasty for what drop etra arturals arthrondensof hip joint for varying midications. Breakett reconstruction operation for ancient unusured fractures of seck of femur fractures of capal naswular bone delayed and adherent paties by massive fat transplantation interphalangeal fracture dislocations treated by different methods.

NRIDER Club feet reconstruction of hand bilateral knock knees drop joint or baseball fingers
Willis Porrs Asil fixation in fractures of neck of femur

RESEARCH AND EDUCATIONAL HOSPITALS

H B THOMAS I'W HARK and C N LAMBERT Opera tion Shelving of a congenital dislocated hip Demonstra tion of patients with closed reduction open reduction and shelving of congenital dislocation VETERANS ADMINISTRATION FACILITY

S K LIVINGSTON Symposium Bone tumors—pirsenta
tuon of photographs of unusual cases

Friday Morning

LUTHERAN DEACONESS HOSPITAL

EMIL VARIAE Indications for surgical treatment of
arthritis

Friday Afternoon
PRESBYTERIAN HOSPITAL

F J BERKHEISER KELLOGG SPEED D RIDER and WILLIS LOTTS OPERATIONS

ST LUKE S HOSPITAL

F A CHANDLER and JOHN R NORCRO'S Knee in ion
grant cell turnor of spine cy t of femur

SHRINER SHOSPITAL FOR CRIPPLED CHILDREN
BEVERROLE VIOLE End results of leg lengthenings,
delitoid tran plant

VETERANS ADMINISTRATION FACILITY

S K LIVING-STON Symposium Maggot treatment of
osteomyeliths—review of 1100 treated cases.

FRACTURES AND TRAUMATIC SURGERY

Monday Afternoon

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and J J CALLARAN Operative
fracture clinic ward walk

JACKSON PARK HOSPITAL
S W M ROBINSON C W HENNEY M J MILLS and
FRANK G MURPHY Traumatic surgery

ST ANTHONY DE PADUA HOSPITAL
F W SLOBE I ractures phases of traumatic surgery

HART E FIGHT Electrical injuries shock burns and glare injury to the eyes with their preventive phases treatment resuscitation et Evolution of resuscitation et evolution of resuscitation et present Hanual mechanical and medical methods Laintern slide and injury treatment of communities and J Javays. Treatment of communities of the present Hanual J Javays. Treatment of communities and missing the present Hanual March 1988.

fracture of the leg

Tuesday Morning

CHICAGO MEMORIAL HOSPITAL
ARTHUR H COVILY and S PERRY ROCESS Sympo mm
Blind pegging of fractures of the femor
FRED MILLER T C BROWTING, EMILE DUVAL and
G M I ANDAU FRELUTE of both bones of lower leg

COOK COUNTY HOSPITAL
WILLIAM R CUBBINS and J J CALLAHAN Fracture ward
walk
ST LUKES HOSPITAL

H E Mock A R Morrow and C E Shavnov Skull fracture exhibit

WASHINGTON BOULEVARD HOSPITAL ARTRUR R. METZ Treatment of unusual fractures Tuesday Afternoon
CHICAGO MEMORIAL HOSPITAL

C R. G FORRESTER HORACE STINION and 4 H VIASON Symposium Nerve repair COOK COUNTY HOSPITAL

SUMMER L KOCH and J J LEBOWITZ Symposium Tenden and perve suturing of the hand with operative clinic PRESBYTERIAN HOSPITAL

F J BERLHEISER KELLOGG SPEED D RIDLE and WILLIS
POTTS OPERATIONS

ST LUKES HOSPITAL

R Durr and R R Durr Jr The use of adhesic
plaster in the treatment of burns, simple traction in dilocations of the shoulder elbow and Colles fracture

Wednesday Morning
COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and J J CALLAHAN Fracture ward walk FREEDERICE DAAS and RICHARD MATTRIES Fracture ward

wall (female)

ST FRANCIS HOSPITAL

W E REDLICH Frictures of the jaw prescutation of

cases lantern slides
ST LUKES HOSPITAL

H F MOCE A R MORROW and C F SHANNON Skull fracture exhibit

Tony D Filis Treatment of traumatic back injuries.

SOUTH SHORE HOSPITAL

FEARL G MUEFRY Skelt tal traction and lower extremity

FEARL 6 MURPHY Skelt tal traction and lower extremity fractures fracture of neck of the femur subtrochanteric o teotomy

Wednesday Afternoon COLUMBUS HOSPITAL

L BEECHER and F LAGORIO Traumatic surgery

COOK COUNTY HOSPITAL

JAMES J CALLAHAN, CARLO S SCUDERI, FREDERICK DYAS and George L Appelbach Symposium knee joint munes

PASSAVANT MEMORIAL HOSPITAL On the Spot" Symposium on Fractures of the

Neck of the Temur

Planned as a complete discussion of one subject. The speakers will not present formal papers but prior to their appearance will be furnished with a list of questions re garding their methods of technique The audience will

base this list of questions in their hands
PAUL B MAGNUSON Various problems concerned in the selection of a method, and prognosis in various types of fractures of the neck of the femur

W EUGENE WOLCOTT Des Moines Iowa The circulation

in the neck of the femur and its effect upon prognosis GEV W LEADEFTER, Washington D C Closed reduc-tion by Leadbetter method followed by immobilization in cast, Whitman position Types of individuals and of fractures to which this method is best suited

LAWSON THORNTON and CALVIN SANDISON Atlanta, Ga Smith Petersen three flange nail with modifications its advantages and disadvantages in use and application in various types of fractures of the neck of the femur AUSTIN T MOORE, Columbia S C Fixation of fractures

of neck of femur use of Moore nails description of tech mique with difficulties and advantages of this method WILLIAM R CUBBINS and JAMES J CALLAHAN Two flange

nail, its method of application, technique and success and failure

ROGER ANDERSON, Seattle, Wash The well leg traction splint, technique of application, its advantages and dis advantages in various types of cases

JAMES K STACK Brackett operation in fresh fractures, selection of cases in which good results may be expected and the contra indications for its selection as a means of treatment

PRESBYTERIAN HOSPITAL

E J BERKHEISER, KELLOGG SPEED D RIDER and WILLIS Ports Operations

ST LUKE'S HOSPITAL

C G SHEARON and GRAHAM KERNWEIN Infections of the hand

Thursday Morning

COOK COUNTY HOSPITAL WILLIAM R CUBBIAS and J J CALLARIAN Fracture ward walk

GARFIELD PARK COMMUNITY HOSPITAL J J CALLAHAN Diagnosis and treatment

MILTON SCHMITT Physiotherapy in fracture work

HENROTIN HOSPITAL

JOHN A GRAHAM Fractures of the lower end of the radius. lantern slides, discussion by ARTHUR R HANSEN Treat ment of nerve injuries in traumatic surgery

JOHN J EIGHSTAEDT Fractures of humerus treated with the use of airplane splints

MAURICE A BERNSTEIN Newer phases of internal de rangement of the knee joint RALPH KORDENAT Cancer of male breast

JACKSON PARK HOSPITAL ARRIE BAMBERGER Demonstration clinic

ST JOSEPH'S HOSPITAL

HUGH Mckenya Demonstration clinic

ST LUKE'S HOSPITAL

II E Mock, A R Morrow and C E SHANNON Skull

fracture exhibit H E Mock and associates Hip fracture demonstration WILL LYON Early closure of open wounds

ST MARY OF NAZARITH HOSPITAL L Czaja Symposium Late results of fractures, clinic

II S MARINE HOSPITAL

HORACE P STIMSON Ununited fractures with osteo myehtis E C LUTTON and R W FLYNN Skeletal traction and

countertraction in treatment of fractures

FRANCES E WILLARD HOSPITAL IAMES A VALENTINE Clinic

Thursday Afternoon CHICAGO MEMORIAI HOSPITAL

ARTHUR H CONLEY and S PERRY ROGERS Blind pegging of fractures of the femur FRED MILLER T C BROWNING, EMILE DUVAL and G M

LANDAU Fracture of both bones of lower leg

COOK COUNTY HOSPITAL

WILLIAM R CUBBINS and J J CALLAHAN Demonstra tion Operative fractures GEORGE APPELBACH Fracture ward walk (female)

WILLIAM R CUBBIAS Operative fracture clinic JACKSON PARK HOSPITAL

S W M ROBINSON, C W HENNAN, M J MILLS and FRANK G MURPHY Traumatic surgery

PRESBYTERIAN HOSPITAL Dry Clinic

Kelloco Speed Displaced intervertebral disc, arthro plasty of elbow epiphysitis of upper end of femur, tendoplasty for wrist drop extra articular arthrodesis of hip joint for varying indications Brackett reconstruction operation for ancient ununited fractures of neck of femur. fractures of carpal navicular bone, delayed and non unions, treated by different methods, treatment of adherent patella by massive fat transplantation, inter phalangeat fracture dislocations, treated by different methods

RIDER Club feet, reconstruction of hand, bilateral knock knees, drop joint or baseball fingers WILLIS POTTS Nail fixation in fractures of neck of femur

FRANCES E WILLARD HOSPITAL

FRED CARLS Clinic

WOVIEN AND CHILDREN'S HOSPITAL ARMINA HILL. Minor injuries MARY E WILLIAMS Fractures, dislocations

Friday Vorning
CHICAGO MEMORIAL HOSPITAL
FORWERTH HOSES STREAM and 4 H March

C R G FORRESTER HORACE STIUSON and A H Wason Fracture

COOF COUNTS HOSPITAL

DR. (STEWOOD and S. LANTON Symposium Fractures in

children with operative clinic
William R. Cubbins and J. J. Callabin. Fracture follow-up clinic case demonstrations

NORMEGIAN AMERICAN HOSPITAL

H A SOTILED Demonstration of technique and presentation of re ulto of the treatment of oblique fractures of the tibia and abula with a simplified turnbuckle and paapparatus chincal conference demonstration of techinque and presentation of results of 50 cases of hip fractures treated by steel pin firstion.

ST BEKNARDS HOSPITAL

R S HESTLINE and E L ARENGORF Fractures of the wrist joint.

L B Downte and M E CREMMTON Fractures of the shaft of the femony

ST LUKE'S HOSPITAL

H. E. Mocs. A. R. McFron and C. E. Shanton, Skull fracture exhibit

Friday Afternoon
COLUMBUS HOSPITAL

F MUELLER L PERCHER and F Lacouro Chine
N L BERCHER Traumatic survery

COOK COUNTY HOSTITAL

James J Catlanian and Carlo S Scuperi, Cadaver
demonstrations

PRESBYTT RIAN HOSPITAL
E I Bereneiste Actiogs Speth D Rider and Willis

GENITO-URINARY SURGERY

Ports Operations

Monday Afternoon COLUMBUS HOSPITAL

WILLIAM GEHL FRANK L CHENOMETR and H E DAVIS Resectoscope for bladder carcinoma

Tuesday Voenting
VOUNT SIN II HOSPIT IL
H RILLICK H SOLOW BY and E HIRSCH SYMPOSHUM
Tumors of the kidney

PASSALANT MEMORIAL HOSPITAL Symposium Tuberculosis of the Cento-Uninary Tract LLEBYLASSE Tuberculosis of the epididymis FRIDERIK LEBERTHAL Pathogeness of renal tubercu

10518
L. L. LESLEY Surgery and postopetative management of renal tuberculosis

PRI SBY TERIAN HOSPITAL

RESESSORMER RUSEST HERBST and associa-

HERMAN L. RESSCHMEN RUBERT HERBST and associates Operations
VIICHAEL REESE HOSPITAL

I KOLL J EI ENSTAEDT H ROLNIG I DHAPTED J GROVE I LIEBERTHAL AND Y E JOVES Symposiums Carcinoma of the unicary bladder

5T MARY OF NAVARLER HOSPITAL

J WELFELD Utologic clinic Malignancy of tumors of the
bladder in children lantern sindes specimens busiones

SOUTH SHORE HOSPITAL
LOLE, D. SMITH. The management of ve had neck obstruction

WESLEY MEMORIAL HOSPITAL

V D LESPENASSE Sternlity

WOVEY 4\D CHILDRE\S HOSPITAL

VARIE ORTHANE PEARL M STETUR and SOFRIE
YOU ARD SAL Properproses with a dumbbell tumor of
the spinal cord resultand unrienticalculu

Tuesday Afternoon

PESEARCH AND EDUCATION AL ROSPITALS

UNICENNA R D Hazards and stiff Operators
undecended testule hypo padus hydrosphrotanephropery Demonstrations Experimental and clin
cal studies on sarpois types of unany antospots
gento urmany anomalies with pecula reference to so
descended testule and hypo padus

ST ANTHONY DE PADUA HO-PITAI

O J Jusa. Prostauc mans, ement carcinoma of bladder
pyrhocraphy

II ednesday Morning CHICAGO MENORIAL HOSPITAL

J WHILLIAM PARKER and JOHN P O NEIL China LOOK COUNTY HOSPITAL

HARRY COINER and M. J. BAKER OPERATIONS
L. L. MESSEN AND M. MICHAEL OPERATIONS
HARRY ROLNICA AND H. M. SOLOWAY OPERATIONS
HARRY ROLNICA AND H. M. SOLOWAY OPERATION

GARFIELD PARK COUNDAIN HOPPTAL

On the man Harmin D Defects Probsens of perhapstosis and upper ureas, tract obtain
ton associated with malposition of Lidneys undeds
anomalies operation lantern sides and motion picture

illustrating the operative technique

VIERCY HOSPITYL

H.E. LANDES BEN FILLES and J. W. FERLIN Symposium

Transactival resection

Transactival resection

Tenescond I Volume Andrey anomalies, trained and prophens of unnary tract.

MUNICIPAL TUBERCULOSIS SANITARIUM
DORRY RUNKER and RECEEV MARIE Spherocomplor renal tuberculo 1 demonstration of imperiodecast postoperative results one to five years including pythorams cheer plates and pathological speciments

PRESBYTERIAN HOSPITAL

HERMAN L KRETSCHMER, ROBERT HERBST and associates Operations

MICHAEL REESE HOSPITAL

I KOLL, J EISENSTVEDT, H ROLVICK, I SHAPIRO, J GROVE, I LIEBERTHAL and A E JONES Operations

Wednesday Afternoon CHICAGO MEMORIAL HOSPITAL

J WILLIAM PARKER, JOHN P O'NEIL, E J STIEGLITZ, D G BRUNJES OTTO SAPHRE AND GEORGE W LANDAU Sumpossium Kulney infections

Symposium Kidney infections
M. L. Weinntein, J. William Parker and John P.
O'Neil. Transurethral resection of the prostate
R. A. Meleydy, J. William Parker, John P. O'Neil. and
O'TTO Sapita Tuberculosis of urinary tract in males

COOK COUNTY HOSPITAL

L L VESEEN, A McNALLY, H ROLNICA and H M SOLOWAY Symposium Pyogenic infection of the upper urnary tract with operative chinic

ST BERNARD'S HOSPITAL

ANDREW SULLIVAN Clinic

ST ELIZABETH'S HOSPITAL

T G McDougall Carcinoma of the bladder

Thursday Morning CHILDRLN'S MEMORIAL HOSPITAL

HERMAN L KRETSCHMER and K BARBER Operations
HERMAN L KRETSCHMER Urological conditions in infants
and children

COOK COUNTY HOSPITAL

HARRY CULVER W J BAKER, CHARLES MCKENNA and E EWERT Symposium Chronic bladder neck obstructions in the male with operations

GARFIELD PARK COMMUNITY HOSPITAL

CLARNOE C SALIMO Carcinoma of bladder, diagnosis, type of treatment and approach result cases, renal calculi, multiple stone in reduplicated pelvis, diagnosis, treatment by heminephrectomy, operative cases, mabg nancy of prostate gland diagnosis method of immediate relief of obstructive symptoms, postoperative radiation therapy, results and show cases seniuman of testes, incarceration of undescended testes, operation, micro scopic diagnosis, tradiations.

JACKSON PARK HOSPITAL

WILLIAM YONKER Transurethral prostatic resection compared to other types of prostatic surgery

PRESBYTERIAN HOSPITAL

HERMAN L KRETSCHMER, ROBERT HERBST and associates Operations

MICHAEL REESE HOSPITAL

I KOLL J EISENSTAEDT H ROLNICK, I SHAPIRO, J GROVE, F LIEBERTHAL and A E JOVES Operations

ST FRANCIS HOSPITAL

BENE FILLIS Presentation of cases

ST LUKE'S HOSPITAL

L E SMITH, HARRY CULVER and associates Genitourinary clinic Urinary calculi

WASHINGTON BOULLVARD HOSPITAL

VINCENT J O CONGR Plastic on renal pelvis for hy dronephrosis review of various types of hydronephrosis with exhibition of films and pathologic specimens

WESLEY MEMORIAL HOSPITAL

V D LESPINASOE and associates Prostatic disease

Thursday Afternoon

VETERANS ADMINISTRATION FACILITY

T G McDougatt Carcinoma of the bladder, diagnosis and treatment—surgical and irradiation

Friday Morning EVANGLLICAL DEACONESS HOSPITAL

PAUL MORE Nephrolithotomy

ILLINOIS MASONIC HOSPITAL

EDWARD W WHITE ROBERT II HAYES and JOHN H GILMORE Renal tuberculosis Avenues of transmission, discussion of the pathogenesis and morbidity, primary foci and complicating factors in relation to general tuberculosis roentgenological aspects concerning prostatic resection

CLARENCE C SAELHOY JOHN H GILMORE and JOHN PISHOTTA CATEMORA of bladder—diagnosis, type of treatment and approach result and cases, renal calculi—multiple stone in reduplicated pelvis, diagnosis treatment by heminephrectomy, operative cases, malignancy of prostate—diagnosis, method of immediate relief for obstructive symptoms postoperative radiation therapy and results, cases, roentgenological advances in urologic diagnosis.

PRESBYTERIAN HOSPITAL

HERMAN L KELTSCHILLE, R HERBST, C WELLER, G BAUDEUGE, J MERRICS and K GERMAN The present status of transurethral resections in the treat ment of bladder neck obstructions, clusse wierer of the bladder surgical accidents during resection of prostate gland renal cysts dulation and injection of ejaculatory ducts in treatment of seminal vesiculitis differential diagnosis of bone metastases in carcinoma of prostate gland renal calculi neuromuscular disfunction of upper urmany tract bladder neck obstruction in women.

VETERANS ADMINISTRATION FACILITY

T G McDougall, J R RIMKER and FREDERICK K HANTOCH Perineal prostatectomy

Friday Afternoon

ILLINOIS MASONIC HOSPITAL

C Orns Rirch and E D Levisourv Nephrectomy, transurethral prostatic resection a momales not upper unnary tract, bilateral and unlateral complete re duplication of kidneys and ureters, incomplete reduplication of kidneys and ureters, incomplete reduplication of kidneys and ureters, bifid pelves, ureteral buds, renal tuberculosis

THORACIC SURGERY

Monday Afternoon

MUNICIPAL TUBERCULOSIS SANITARIUM Collapse Therapy Clinic 23 N Wacker Drive

STAFF Demonstration of collapse therapy measures on ambulatory patients discussion of indications results complications and technique

Tuesday Morning

ALBERT MERRITT BILLINGS HOSPITAL W E Apams and associates Experimental esophageal surgery

COLUMBUS HOSPITAL

R M DAVISON C VOLINI M JOANNIDES, D ORTH G MUELLER and I F VOLINI Symposium on tubercu losis Thoracic surgery pneumothorax treatment in cluding climatotherapy LOOK COUNTY HOSPITAL

JOHN B O DONOGHLE and ROBERT LEE Treatment of empyema ward walk and presentation of cases

RESEARCH AND LDUCATIONAL HOSPITALS WILLARD VAN HAZEL Operations with demonstration of cases

VETERANS ADMINISTRATION FACILITY JEROME R HEAD Vew type of thoracoplasty chest surgery

Tuesday Isternoon

COOK COUNTY HOSPITAL R B BETTMAN and W A POTTS Operations

MUNICIPAL TUBERCULOSIS SANITARIUM FRANK SMEJKAL FRANK FREMMEL and GEORGE TLENER Preumothorax pneumoperitoneum ofeothorax

PRESBYTERIAN HOSPITAL

Treatment of Nontuberculous Pulmonary Suppuration EARLE GRAY Medical aspect GEORGE SHAMBAUGH Bronchoscopic aspect JOHN M DORSEY Surgical aspect

RESEARCH AND EDUCATIONAL HOSPITALS WILLIARD VAN HAZEL and staff Symposium Broncho genic carcinoma

S LEVINSON Pathology ADOLPH HARTUNG Roentgenological diagnosis
PAUL II HOLINGER Bronchoscopic aspects BENJAMIN GOLDBERG Medical aspects

WILLARD VAN HAZEL Surgical consideration, demonstra tion of cases and specimens surgical treatment of mediastinal tumors

T J WACHOWSKI Roentgenological considerations of mediastinal tumors

M JOANNIDES Collapse therapy of pulmonary tubercu losis

ST BERNARD'S HOSPITAL 1 H MONTGOMERY and R E CLEMINGS Pencarditis

with effu ion demonstration of case R J DREVER Rational treatment of empyema S L GOVERNALE and F F FIORE Congenital cyst of lung

EVANSTON HOSPITAL TERME R HEAD Indications for lobectomy

II ednesday Morning

MUNICIPAL TUBERCULOSIS SANITARIUM RICHARD DAVISON and GILBERT SCHWEIDER Thoraco-

plasty review of series of operated cases with discussion of indications technique results and demonstration of cases x ray pictures
Collapse Therapy Clinic 23 N Wacker Drive
STAFF Phrenics artificial pneumothorax pneumopen

toneum

II ednesdav Aflernoon

PRESBYTERIAN HOSPITAL Iouv 1 Dorsey Operations

ST LUKES HOSPITAL WILLARD VAN HAZEL. Chest surgery demonstration of

PAUL HOLINGER Bronchoscopic aspect of chest surgery

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL

II E Apans and associates Operations MUNICIPAL TUBERCULOSIS SANITARIUM

RICHARD DAVISON GILBERT SCHNEIDER CAUILLO VOLINI and LOREN COLLINS Thoracoplasty first and second stage discussion of technique indications and results pneumolysis open intrapleural technique and post operative management

RESEARCH AND EDUCATIONAL HOSPITALS Symposium Bronchiectasis and Pulmonary Tuberculous BENJAMIN GOLDBERG Medical considerations PAUL H HOLINGER Bronchoscopic considerations WILLARD VAN HAZEL Surgical considerations

Thursday Afternoon

COOK COUNTY HOSPITAL R B BETTMAN and W A Ports Operations

extrapleural pneumolysis

PASSAVANT MEMORIAL HOSPITAL JEROME R HEAD A new type of thoracoplasty for pul mooary tuberculosis and certain unusual applications of

PRESBYTERIAN HOSPITAL JOHN M DORSEY Operations

MICHAEL REESE HOSPITAL

RALPH B BETTHAN and WILLIAM TANNEYBAUM Thorack surgery

Friday Morning

ILLINOIS MASONIC HOSPITAL

MINAS JOANNIDES ROBERT H HAYES and W E KEESEY Primary carcinoma of lung demonstration of cases diagnosis and treatment pulmonary abscess demonstra tion of cases etiology clinical picture and therapeusis electrothorax, indications, technique and complications advantages of artificial pneumoperstoneum as an adjunct to phrenic neurectomy, operation closed intrapleural pneumonolysis, two cases, indications, technique and results, phrenic neurectomy, phrenic crush, scalemotomy

and electrothorax

ROBERT H HAYES Pulmonary tuberculosis, advantages
of artificial pneumothorax, artificial pneumothorax, 10
cases, operation, artificial pneumothorax

MUNICIPAL TUBERCULOSIS SANITARIUM

Collapse Therapy Clinic, 23 N Wacker Drive STAFF Pneumolysis, oleothorax, artificial pneumothorax, pneumoperitoneum

MICHAEL REESE HOSPITAL

RALPH B BETTMAN and WILLIAM TANNENBAUM Thor acoplasty operation

MAX BIESENTIAL Surgery of pulmonary tuberculosis
MAX BIESENTIAL and RALPIE B BETTMAN Technique of
various operations used for pulmonary tuberculosis
Yrthical pneumothorax, pneumolysis, thoracoplasty
motion picture and diagrammatic demonstrations

RALPH B BETTHAN Treatment of empyema, injuries of the chest, presentation of cases, motion picture and diagrammatic demonstrations

WOMEN AND CHILDREN'S HOSPITAL

HELEN HAYDEN, EMELIA GIRYOTAS, MARGARET AUSTIN and NORA B BRANDENBURG Bronchoscopy in relation to asthma and allied pulmonary conditions, lipiodol injection

Friday Afternoon

COOK COUNTY HOSPITAL

JOHN B O'DONOGHUE FREDERICK TICE, RICHARD JAFFE, M J Husent, S H ROSENBLUM and A J HRUBY Symposium Pulmonary tuberculosis with operations

PRESBYTERIAN HOSPITAL

JOHN M DORSEY Operations

Daily

ST LUKE'S HOSPITAL

Paul Holinger Exhibit

NEUROSURGERY

Monday Afternoon COOK COUNTY HOSPITAL

H C Voris and J J Kearns Intractanial injury—dem onstration of pathology, physiology, management, surgical interference, sequelæ, complications

Tuesday Morning PASSAVANT MEMORIAL HOSPITAL

LOYAL DAVIS and JOHN MARTIN Presentation of patients emphasizing diagnosis and treatment of peripheral nerve injuries, trigeminal neuralgia spinal cord tumors and

RESEARCH AND EDUCATIONAL HOSPITALS
GEZA DETARATS Operation Lumbar sympathectomy

intracranial tumors

Symposium Neurocirculatory Diseases
R Brunner The use of neosynephrine in spinal anes
thesia

PAUL W SMITH Mechanisms governing peripheral circu-

WILLIAM C BECK Selection of cases for sympathectomy, demonstration of sympathectomized patients evaluation of results the management of lymphedema

F K Hick Vascular accidents associated with coronary disease

H C LUETH Unusual reactions following the use of nitroglycerine

GEZA DETAKAIS The treatment of acute arternal occlusion, operability of hypertension, demonstration of cases EUNICE KOTH Observations on and results of suction and pressure (pavaex) therapy

pressure (pavaev) therapy
H L MISHEIN and P J SARMA The treatment of vari
cose veins and ulcers

J T REYNOLDS Amputations in peripheral vascular disease

Tuesday Afternoon MERCY HOSPITAL

C F Schaub and H C Voris Neuro ophthalmology, Presentation of cases with fundi perimetric field findings, discussion of diagnostic problems presentation and dis cussion of cases of recurrent papilledema following cra nial explorations and decompressions

PRESBITERIAN HOSPITAL

John Favill Diagnosis of traumatic epilepsy A Verbrugghen Treatment of traumatic epilepsy Loren Avery Diagnosis and treatment of traumatic psychoses

ST LUKE'S HOSPITAL

ERIC OLDBERG Operation

GEZA DETALATS Demonstration of late results in patients following sympathectomy for neurocirculatory disorders JOHN COULTER Physical therapy in the treatment of peripheral vascular disease

GEORGE K FENN The management of the surgical diabetic

CARL A JOHNSON Neosynephrine in postoperative shock RICHARD CAPPS The carotid sinus syndrome and its surgical significance

GEORGE SCUPRAM Classification in hypertension

Wednesday Morning

RESEARCH AND EDUCATIONAL HOSPITALS
Eric Oldberg Operations and demonstration of cases

Wednesday Afternoon

PRESBYTERIAN HOSPITAL

A VERBRUGGHEN Operations

Thursday Morning

RESEARCH AND EDUCATIONAL HOSPITALS

Eric Oudberg Operations and demonstration of cases

Thursday Afternoon

COOK COUNTY HOSPITAL

A VERBRUGGHEY Demonstration Surgical paraplegia etiology, pathology, classification, physiology, treat ment, prognosis

MERCY HOSPITAL

H C VORIS and H E I ANDES Demonstrations of choroid plexus resection in hydrocephalus cystometric studies in neurological lesions

MINIOTORIA TECTOR
Symposium Management of Cerebral Ghomas
V E GOVDA Clinical diagno is
J F SHEETIN Pathologic classification and diagnosis
P A NELSON Roentgen ray treatment
H C VORIS Surgical management
C F Seria, and H C VORIS Neuro-ophthalmology,

Presentation of cases with funds perimetric field findings discussion of diagnostic problems presentation and dis-cussion of cases of recurrent papilledema following cramal explorations and decompressions

PRESBYTERIAN HOSPITAL A VERBRIGGHEN Operations

MICHAEL REESE HOSPITAL

Symposium Intracranial Suppuration ROY GRINKER Neurological aspects of intracranial sup-

A VERBRUGGHEN Surgical aspects of brain abscess

Friday Afternoon PASSAVANT MEMORIAL HOSPITAL

LOYAL DAYIS and JOHN MARTIN Presentation of patients emphasizing the treatment of peripheral vascular diseases and malignant hypertension

PRESBYTERIAN HOSPITAL

A VERBRUGGHEN Operations ST LUKES HOSPITAL

ERIC OLDBERG Operation

ROENTGENOLOGY

Monday Afternoon

ST LUKE'S HOSPITAL E L JENNISON E W ROBERTS A F HUNTER and W Washow Lesions of terminal ileum

Tuesday Morning

LUTHERAN DEACONESS HOSPITAL KALPH WILLY Newer concepts in the treatment of car

cinoma ST LUKES HOSPITAL

E L JENKINSON E W ROBERTS A F HENTER and W Waskow Interesting ca es pathology shown by z ray ST MARY OF NAZARETH HOSPITAL

C J CHALLENGER A ray studies of surgical conditions

Tuesday Ifternoon ST ANTHONY DE PADUA HOSPITAL

L S Ticara Salicosis demonstration

ST LUKES HOSPITAL L L JENAINSON E W ROBERTS A F HUNTER and W Waskou Gall bladder visualization following medical treatment

Il ednesday Morning ST LUKES HOSPITAL

L L JENALISON E W ROBERTS A F HENTER and W Waskow Gall bladder visualization following surgical dramage

Il ednesday Afternoon AUGUSTANA HOSPITAL

DAVID S BEILEN Diagnosis of gastro intestinal lesions. ALBERT MERRITT BILLINGS HOSPITAL PAUL C Hodges and associates \ ray diagnosis ST LUKES HOSPITAL

E L JENKINSON E W ROBERTS A F HUNTER and W Waskow Interesting bone pathology

Thursday Mornine LUTHERAN DEACONESS HOSPITAL

RALPH WILLY Newer concepts in the treatment of car cinoma RESEARCH AND EDUCATIONAL HOSPITALS

ADOLPH HARTLAG Conference on x ray diagnosis with particular reference to bone dystrophy lesions of the urinary tract brain tumors and unusual lesions of the gastro intestinal tract

ST FRANCIS HOSPITAL A C LEDOUX Use of v ray in surgical infections ST LUKES HOSPITAL

E L JENEINSON L W ROBERTS A F HUNTER and W MASKON Interesting cases pathology shown by v ray

Thursday Afternoon COOK COUNTY HOSPITAL

ROBERT F McNarria High voltage therapy of male narcies M J HUBEN Roentgenological examination of appendix

MOUNT SINAI HOSPITAL MAX CORN G DAYELILS and E LEWIN Demonstrations of interesting radiologicosurgical conditions

ST LUKES HOSPITAL E L JENEINSON E W ROBERTS A W HUNTER and W Waskow Mahanancies of lungs

Friday Morning

PASSALANT MEMORIAL HOSPITAL James T Case Technical considerations in gastrointestinal radiology round table discussion on radiation

therapy of carcinoma of breast The evolution of primary tuberculous EARL BARTE infection of the lungs in roentgenograms round table discussion on miscellaneous roentgen therapeutic appli

cations ST LUKES HOSPITAL

E L JENETSON E W ROBERTS A F HUNTER and W Waskou Interesting cases pathology shown by a ray Friday 1sternoon

AUGUSTANA HOSPITAL

DAVID S BETLEY Diagnosis of lesions of urmary tract COOK COUNTY HOSPITAL

J PAUL BENETT Roentgenological examination of the kidneys ureters and bladder ROBERT F MCVATTEN High voltage therapy of malig

nancies ST LUKES HOSPITAL

E L JENAINSON E W ROBERTS A F HUNTER and W Waskon Interesting cases pathology shown by x ray

TUMORS AND IRRADIATION

Monday Afternoon ST ELIZABETH'S HOSPITAL

I BRAMS Radium treatment of tumors

VETERANS ADMINISTRATION FACILITY G R ALLABEN and associates Regular tumor choicpresentation of cases, diagnosis and treatment

Tuesday Morning MICHAEL REESE HOSPITAL

MAN CUTLER JEROME F STRAUBS and SAMUEL PEAKL MAN Radium therapy in malignant tumors of the head and neck demonstration of cases and technique

ST ELIZABETH'S HOSPITAL

M G Lukey Sarcoma of the stomach VETERANS ADMINISTRATION LACILITY

A E WILLIAMS Inspection of deep x ray and radium therapy unit

Tuesday Afternoon RAVENSWOOD HOSPITAL

C A BUSWELL, J J Moore, H P SAUNDERS and L E SCHAEFFER Cancer clinic, presentation of specimens, lantern slides, cases illustrating melanomas of shoulder and jaw

RESEARCH AND EDUCATIONAL HOSPITALS WILLARD VAN HAZEL and staff Symposium Broacho genic carcinoma

S LEVINSON Pathology

ADOLPH HARTUNG Roentgenological diagnosis
PAUL H HOLINGER Bronchoscopic aspects

BENJAMIN GOLDBERG Medical aspects
WILLARD VAN HAZEL Surgical consideration, demon-

stration of cases and specimens, surgical treatment of mediastinal tumors

I I WALHOWSKI Roentgenological consideration of mediastinal tumors

M JOANNIDES Collapse therapy of pulmonary tubercu losis

Wednesday Morning

ALBERT MERRITT BILLINGS HOSPITAL Symposium Tumor Surgery

A Brunschwio Experimental production of tumors and the efficacy of bacterial filtrates in the treatment of experimental sarcoma palliative treatment of pulmonary metastases from malignant tumors, late results in the treatment of benign giant-cell tumors of bone

W E ADAMS and associates Intrathoracic neoplasms D B PHEMISTER and associates Studies in the etiology,

diagnosis and treatment of bone tumors HARWELL WILSON Extraskeletal ossifying tumors NORMAN ROOME Air injections in the diagnosis of retro

peritoneal tumors
W J Noonan X ray treatment of spermatocele

GARFIELD PARK COMMUNITY HOSPITAL CARROLL W STUART Malignant tumors of bead and neck

LUTHERAN DE ACONESS HOSPITAL ISADORE PILOT Pathology of malignant growths in rela tion to therapeutic indications

VETERANS ADMINISTRATION FACILITY

MAX CUTLER and associates Annual tumor clinic Presen tation of cancer cases, indications, technique and results of radium therapy

Thursday Morning COLUMBUS HOSPITAL

D A ORTH, M HANNAN and H E DAVIS Breast cancer

LUTHERAN DEACONESS HOSPITAL

ISADORE PILOT Pathology of malignant growths in rela tion to therapeutic indications

MERCY HOSPITAL

W J PICKETT Unusual cases of malignancy

MICHAEL REESE HOSPITAL

MAX CUTLER and staff Results of radiation treatment of cancer of mouth, tonsil pharynx and larynx, presenta tion of cases Radiation treatment of cancer of the breast presentation of cases Motion pictures illustrating technique of radium treatment of cancer of mouth and cancer of cervix Transillumination of breast

ST CLIZABETH'S HOSPITAL

LEO M ZIMMERMAN Mediastinal tumors

VETERANS ADMINISTRATION FACILITY

A E WILLIAMS Inspection of deep v ray and radium therapy unit Thursday Afternoon

PASSAVANT MEMORIAL HOSPITAL

MAX CLILLR The organization of a tumor clinic Per sonnel, equipment, records, follow up Carcinoma of the Breast

JOHN A WOLFER Surgical considerations JAMES T CASE Pre and postoperative v ray radiation

M ROSENTUAL Radium treatment Major Greene Bronchiogenic tumors of the neck JOHN F DELPH and EARL BARTH Carcinoma of the larynx hypopharynx and tonsil

JOHN MOHARDY A survey of some proposed cancer cures

Friday Morning

MERCY HOSPITAL

HENRY SCHMITZ, HENRY L SCHMITZ, HERBERT E SCHMITZ and P A NELSON Symposium Radiologic therapy of malignaocy

RESEARCH AND EDUCATIONAL HOSPITALS

R B MALCOLM Operations Neck dissection, carcinoma of breast, surgical pathology of breast tumors

T J Wachowski X ray treatment of carcinoma of breast GEORGE DETARVOWSKY Hemangiomas

ARRIE BAMBURGER Ewing tumor with case report

ST LUKE'S HOSPITAL

H E Mock, WILLIAM BROWN E W RYERSON, E F HIRSCH and E L JENKINSON Tumor clinic Demon stration of pathology, diagnosis treatment of malignan cies of the breast and clavicle

WESLEY MEMORIAL HOSPITAL I ARL LATIMER Unusual breast tumors

Friday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS Symposium Diseases of the Ga, tro-Intestinal Tract George Milles. Pathology of carcinoma of tomach. T] WACHOWSKI \ray diagnosis of carcinoma of stomach.

W H. COLE. Total gastrectomy

C. L. BIRCH Anemia associated with total gastrectomy M H. STREICHER. Dagnosa of carcinoma of the return. C B Person Surgical treatment of caremons of the recture.

VETERANS ADMINISTRATION FACILITY G R. Allaben and associates. Regular tumor clinic-nesentation of cases, diagnosis and treatment.

PHYSICAL THERAPY

Monday Afterroon COOK COUNTY HOSPITAL DISRAELI KOBAK General physical therapy procedures. NORTHWESTERN UNIVERSITY MEDICAL

SCHOOL JOHN S COULTER and S L OSBORNE, Chineal and expen mental investigations of short wave medical diathermy

MICHAEL REESE HOSPITAL C O MOLANDER Ward walk, physiotherapy methods.

Tuesday Morning COOK COUNTY HOSPITAL

DISPABLI KOBAK In postgraumatic conditions. Tuesday Afternoon

COOK COUNTY HOSPITAL I F HUMMON Physical therapy in infantile paralysis. MICHAEL REESE HOSPITAL

S PERLOW and C O MOLANDER Physical therapy in the treatment of circulators disturbances.

Il ednesday Morning

COOK COUNTS HOSPITAL DISEARLI KOBAK In postoperative traumatic infections. NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

HERMAN CHOR Rationale 17 muscle disorders. JOHN S COTATER. Clinical and experimental results.

MICHAEL REESE HOSPITAL

FRANK GLASSMAN and C. O. MOLANDER Physical therapy in the treatment of fractures.

> Wednesday Afternoon COOK COUNTY HOSPITAL

I F HUMMON Physical therapy in neurosurgical and neurological conditions.

PASSALANT MEMORIAL HOSPITAL J S COULTER Physical therapy in fractures. STEVER L KOCH MICHAEL L MASON and J S COULTER. Physical theraps in hand injunes. MICHAEL REESE HOSPITAL

I WOLES and C O MOLANDER. Physical theraps in the treatment of poliomy chitis. SIDNEY SIDEMAN and C O MOLANDER. Physical theraps in treatment of spastics.

Thursday Morning COOK COUNTY HOSPITAL Dispared Konak. Physical therapy in low back conditions.

GARFIELD PARK COMMUNITY HOSPITAL Militox Schullt Hyperpyrena in gonorrheal arthriti.
value of heating til sues by induction—hyperpyrena.

ILLINOIS CENTRAL HOSPITAL

JOHN S COTATER. Under water exercises in the treatment of fractures of weight bearing bones.

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL. J S COULTER and S L. OSBORNE, Hyperpyrena in chrock

infectious arthrit F CRANDLER, J. R. VORCROSS and J. S. COTLIER, Management of low back conditions.

MICHAEL REESE HOSPITAL BERT FINNE. Hyperpyrexus in gonorrheal arthritis.

Thursday Afternoon COOK COUNTY HOSPITAL I F HUMAN Manipulative treatment in low back con

GARFIELD PARK COMMUNITY HOSPITAL Militon Scincitt. Hyperpyrena in concribeal arthru.

value of heating thisies by induction-hyperpyrena. VORTHWESTERN UNIVERSITY MEDICAL

SCHOOL EVIL HATSER and J S COULTER. The rôle of physical therapy in common disorders of the foot.

MICHAEL REESE HOSPITAL JULIUS GRINKER and C O MOLANDER, Physical therapy

in treatment of perpheral nerve injunes.

Friday Merning

COOK COUNTY HOSPITAL Distanti Konar Physical therapy in bursitis.

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J S COULTER. Physical therapy in traumant arthress.

Friday 4f ernovn COOK COUNTY HOSPITAL

I F HOMEN In the prevention of deformaties.

MICHAEL REESE HOSPITAL LESTER FRANKENTHAL and C. O MOLANDER. Physical theraps in treatment of chronic pelvic inflammation.

ST LUKE'S HOSPITAL IOHN S COULTER. In recon truction surren

PLASTIC AND FACIOMAXILLARY SURGERY

Tuesday Morning CHICAGO MENIORIAL HOSPITAL CASPER M EPSTEIN Plastic, faciomavillary surgery

COOK COUNTY HOSPITAL

JOSEPH E SCHAEFER and L W PENHALE Demonstra tion of cases of carrected temporomandibular ankyloses barelips and cleft palate cases pedicle flap and full thick ness graft cases repair of burns, traumatic injuries also plastic repairs of controlled carcinoma cases

ST JOSEPH'S HOSPITUL

WILLIAM H G LOCAL Oral surgery Tuesday Isternoon

COOK COUNTY HOSPITAL I I MUSEAT and H M GOLDEN Plastic surgers of the nose and face

PRESBYTERIAN HOSPITAL

PREDERICA MOUREHEAD Elastic traction in plastic surgery and fractures of the law

MICHAEL RLESE HOSPITAL SAMUEL SALINGER and CASPER EPSTEIN Nasal and facial plastic surgery, freatment of injuries to the face

Wednesday Morning PRESBYTERIAN HOSPITAL TREDERICA MOORENEAD and R OLLISTED Operations RESEARCH AND EDUCATIONAL HOSPITALS PAUL GREELEL Plastic surgery

ST LUKE'S HOSPITAL H & Ports and F W MERRIFIELD Choic

Il ednesday Afternoon MOUNT SINAI HOSPITAL

E Assos and associates Oral surgery

Thursday Morning COOK COUNTY HOSPITAL

JOSEPH F SCHAFFER and A W PENHALE Cases of carcinoma of mouth, lips and face—with colored photo graphs of lesions before and after radiation

PRESBYTERIAN HOSPITAL

PRIDERICA MOORENE AD and R OLLISTED Operations MICHALL RLLSE HOSPITAL

CASPER EPSTEIN Oral SUIGETS

ST JOSEPH'S HOSPITAL UILLIAM H G LOCAN Oral surgery

Friday Mornine

PRESBYTERIAN HOSPITAL TREDERICS MOOREHEED and R OLLISTED Operations

RESEARCH AND EDUCATIONAL HOSPITALS

L W Schutz Oral surgery cless palates and harelips ST LUKE'S HOSPITAL

H A Ports and F W Merriffeld Linic

Friday Afternoon CHILDREN'S MEMORIAL HOSPITAL

L " SCHULTZ A treatment for subliviation of the temporomandibular joint

EXPERIMENTAL SURGERY

Thursday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS W P KLEITSCH The effect of intravenous glucose and salme solutions on the motility of isolated segments of small intestine

L W SCHULTZ The effect of scierosing agents on joint membranes and the clinical application to dislocations or sublusations

S R ROSENTHAL. The torm and autitorm of burns C B Puestow The use of vitamin ods in the treatment of burns produced experimentally

LEGID ARNOLD Studies in the development of a new mask for use in the operating room

W H COLE Experimental studies on the mechanism of production of so-called collapse

D. HERROLD Experimental and clinical experiences

"51th unnary antiseptics D P SLAUGHTER Studies on the excretory function of the

iner G L Zecnez. Experiments with tissue cultures with par

ticular reference to malignant tumors
6 DETARATS W BECK and C SWEITZER The experi mental production of pulmonary emboli

Friday Morning NORTHWESTERN UNIVERSITY MEDICAL SCHOOL.

LEOV ARIES Acceleration of bone growth and repair as determined by deposition of dye in the callus

R A BUSSABAPGER 5 FREEMAN and A C IVY The rôle of the stomach in calcincation of bone (Exhibit of gas trectomized puppies showing homogenous osteoporosis) ELUER I LOCUR The effect of various foods upon bile

secretion with and authout return of bile to the gastro intestinal tract

C R Schington and J M Effect. The effect of diet on panceatic secretion (The results obtained guide the postoperatic care of a patient with duodenal institute) William Dachmard and Sauret J Focessov. Common duct transplantation (Seaths shows size of implantation

of common duct is important in preventing subsequent ascending infections of bihary passages)

MICHAELL MASOV and HAR EY'S ALLEY Experimental studies on tendon repair

LEO M ZIMPERMAN Surgical repair of inguinal hernia as guided by anatomical studies (A simplification of surgical technique)

JOHN MARTY Negative effects of midbrain lessons on gas tric secretion modifity and gastro intestinal ulceration in monkeys and cats. A Horsley Clarke apparatus was used to produce midbrain lessons in eats and monkeys H Chox. The rationale of physical therapy in muscledisor ders. Experimental observations on massage passase

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movement electrical stimulation and rest on muscle atrophy and regeneration in the lower motor neuron type of paralysis

MICHAEL REESE HOSPITAL
RAIPH B BETTHAN Closure of large bronchs,

OPHTHALMOLOGY

Monday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

A C KRALSE Discussion of hereditary retinoses

A C LEAUSE Discussion of hereditary retimoses
CHILDRE'S NEMORIAL HOSPITAL
G GUIBOR Orthoptics

COOK COUNTY HOSPITAL

E B FOWLER Fundus diagnostic clinic
ILLINOIS ENF AND EAR INFIRMARY
R VON DER HENDT and J LOWELL Operations
DWIGHT C ORCUTT and I O CONNOL Diagnostic clinic

MERCY HOSPITAL

C F SCHAUB F I BARNETT and E A ROLING Fundus
MICHAEL REESE HOSPITAL

MICHAEL REESE HOSPITAL
PRILIP HALPER Orthoptics

Tuesday Morning

O H KRAFT and B T HOFFMAN Operations cases
\ORTHWESTER\ UNIVERSITY \UFDICAL
SCHOOL

CEURGE GUIBOR Orthoptics classification of squint SANFORD R GIFFORD Concomitant and paralytic squint RUSH MEDICAL COLLEGE

DR WILBER Histopathology

Tuesday ifternoon
ALBERT MERRITT BILLINGS HOSPITAL

C V DEVNEY Orthoptics
COLUMBUS HOSPITAL

M GOLDENBURG Eye clinic COOK COUNT'S HOSPITAL

C F YERGER Medical ophthalmology
ILLINOIS EYE AND EAR INFIRMARY

THOMAS D ALLEY Operation for glaucoma and estaract LOUIS HOPFMAN and E. K. FINDLAY Diagnostic chines MERCY HOSPITAL

C F SCHAUB and H C VORIS Neuro ophthalmology Presentation of cases with fundi perimetric field find ings discussion of diagnostic problems presentation and discussion of cases of recurrent papilledems following cranial explorations and decompressions

MOUNT SINAI HOSPITAL

J LEBENSOHN and F SELENCER Operations
VICHAEL REESE HOSPFTAL
T M SHAPIRA Fundus clinic

ST LUKES HOSPITAL

E A VORISER Presentation of clinical cases

Wednesday Morning
COOK COUNTY HOSPITAL

SANFOAD R GIFFORD and N LAZAR Retural detachment.

GRANT HOST ITAL

O H KRAFT and B T HOFFMAN Operations and cases

RUSH MEDICAL COLLEGE
W F MONCRETEF Cataract motion pictures

II ednesday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

S S BLANSTEIN End results of retinal detachment

CHILDREN'S MITMORIAL HOSPITAL

R C GAMBLE and E A VORISE Diagnostic clinic ILLINOIS EVE AND EAR INFIRMARY DWIGHT C ORCUTT Operation for glaucoms and catarat. S J MEYER and T ZICKMAN Retinal detachment & H CRUPAN Orthopics

MERCY HOSPITAL

C F SCHAUB, F J BARNEIT and E A ROLLING Fundus MICHAEL REESE HOSPITAL

S J MEYER and D SYNDACEER Retinal detachment ST BERNARDS HOSPITAL

C P SLEERAN Ocular funds lantern slide demonstration ST LUKE'S HOSPITAL

J WALSH Clinical cases

U S MARINE HOSPITAL
ALFRED N MURRAY Fye injunes

Thursday Morning
CRANT HOSPITAL

O II KRAFT and B T HOFFMAN Operations and cases.
SOUTH SHORE HOSPITAL

JOHN STANTON Removal of foreign bodies

Thursday Afternoon

ALBERT MERRITT BILLINGS HOSPITAL

L BOTHMAN Demonstration and discussion of disciform macular degeneration (Kuhnt Junus)

COOK COUNTY HOSPITAL

F B FOWLER Fundus clinic
ILLINOIS EYE AND EAR INFIRMARY

E K FINDLAN Operations
LOUIS HOFFMAN Operations
THOMAS D ALLEN (claucoma

HLINOIS MASONIC HOSPITAL

ALIA SONERS Cataract extraction Fisching technique dimtrophenol cataracts—treatment results

MERCY HOSPITAL

C F Schaub and H C Voris Neuro ophthalmology Presentation of cases with fundi, perimetric field find ings, diagnostic problems, recurrent papilledema following cranial explorations and decompressions

MICHAEL REESE HOSPITAL JACK COWAN Glaucoma clinic

RUSH MEDICAL COLLEGE DR JACOBSON Fundus clinic

ST LUKE'S HOSPITAL FRANK E BRAWLEY and J W CLARK Clinical cases

Friday Morning

GRANT HOSPITAL O H KRAFT and B T HOFFMAN Operations and cases

Friday Afternoon ALBERT MERRITT BILLINGS HOSPITAL

M SHELLMAN Cataract results

CHILDREN'S MEMORIAL HOSPITAL

R O RISER Diagnostic clinic

COLUMBUS HOSPITAL

M GOLDENBURG and C J SCHERIBEL Eye clinic HENROTIN HOSPITAL

GEORGEW MAHONEY, E A ROLING and I BARNETT Clinic

ILLINOIS EYE AND EAR INFIRMARY

S J MEYER and T ZICKMAN Glaucoma and cataract R VOY DER HEYDT Slit lamp demonstration RUSH MEDICAL COLLEGE

E. Springer Medical ophthalmology

ST LUKE'S HOSPITAL R C GAMBLE Clinical cases

OFOLARYNGOLOGY

Monday Afternoon COOK COUNTY HOSPITAL

NORMAN LESHIN Interesting cases with methods of ex amination and diagnosis and endoscopy SAMUEL PEARLMAN Carcinoma of the larynx, bronchos copy, esophagoscopy

ILLINOIS EYE AND EAR INFIRMARY SAMUEL SALINGER Facial plastic surgery SIDNEY POLLACE Nasal fractures

BERNARD M COHEN Nasal and ear prostheses Symposium Intracranial Otogenic Complications
M GLATT Petrositis

JACOB LIFSCHUTZ Brain abscess C H Christoph I ateral sinus thrombosis

RESEARCH AND EDUCATIONAL HOSPITALS

O E Van Alvea Surgical anatomy of masal sinuses MANUEL G SPIESMAN Diseases of the pharynx Selvio A Sciaretta Conservative treatment of chronic suppurative otitis media

RUSH MEDICAL COLLEGE LOUIS T CURRY and FRANK WOINIAK Sulfanilamide in the treatment of meningitis

Tuesday Morning

ALBERT MERRITT BILLINGS HOSPITAL

J R LINDSAY Petrositis

GRANT HOSPITAL GEORGE DENNIS FRANCIS L LEDERER, S H SOBOROFF and George F McIntyre Operations and cases MOUNT SINAI HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIFSCHUIT, S M MORWITZ FRANCIS L LEDERER M R GUTTMAN, M GLATT J FISHMAN, M KARMER AND A HOLLENDER Clinics with special reference to plastic surgery and treatments about the head and neck

NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

J F DELPH A H ANDREWS and GLENN J GREENWOOD Technique of endobronchial aspiration T P O CONNOR Nasopharyngitis

MARION A ANDREEN Results of different methods for raising the temperature of the antrum GLENN J GREENWOOD Audiometric readings in allergy H C BALLENGER Audiometric testing

I F DELPH Benign tumors of the vocal cords MICHAEL REESE HOSPITAL

MAY CUTLER, JEROME E STRAUSS and SAMUEL PEARL

MAN Radium in malignancies of head and neck RESEARCH AND EDUCATIONAL HOSPITALS PAUL H HOLLAGER Diseases of the laryny

ST JOSEPH'S HOSPITAL AUSTIN A HAYDEN Conservation of hearing, mastoid and

sinus surgery Tuesday Afternoon

COOK COUNTY HOSPITAL

A LEWY The mastoid and the labyrinth J LIFSCHUT2 Pneumography HENROTIN HOSPITAL

J C BECK and M R GUTTMAN Tumors about the head

and neck, plastic and reconstructive surgery of nose O E VAN ALYEA Irrigation of frontal and maxillary sinuses, supplemented by colored motion pictures and anatomic Specimens

MICHAEL REESE HOSPITAL

SAMUEL SALINGER and CASPER EPSTEIN Nasal and facial plastic surgery treatment of injuries to the face

RESEARCH AND EDUCATIONAL HOSPITALS FRANCIS LEDERER EAR, nose and throat plastic surgery FRANCIS LEDERER, J THEOBALD, W H THEOBALD

NOAH FOX, S SHAPIRO, A R HOLLENDER, O E VAN ALYEA, J HARNER, S HORWITZ, N FABRICANT and L FISHMAN Operations

RUSH MEDICAL COLLEGE

ELMER HAGENS Pathology of the petrous hone in cases dying of meningitis PAUL CAMPBELL Function of vestibular apparatus and a few details of tonsillectomy (colored motion pictures)

ST MARY OF NAZARETH HOSPITAL

J J KILLEEN Mastorditis in children

Wednesday Morning

COOK COUNTY HOSPITAL

I MUSEAT Plastic surgery of nose and face
L CLERY Mastorditis and meningitis

L Curry Mastorditis and meningitis
GRANT HOSPITAL

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CEORGE DENNIS FRANCIS L LEDERER S H SOBOROFF and GEORGE F McINTURE Operations and demonstration of cases

MOUNT SINAL HOSPITAL

JOSEPH C BECK ALFRED LEWY JACOB LIPSCHUTZ S W. MORWITZ FRANCIS LEBERER M R GUTMAN M GLATT J FISHMAN W KRAMER and A HOLLENDER Chinics with special reference to plastic surgery and

treatments about the head and neck

J W HARNED Operations clinical conference the treat ment of asthma in otolaryngological practice

MICHAEL REESE HOSPITAL

JOSEPH BECK and M. REESE GUTTMAN. Surgical treat
ment of otogenic meningitis and operations.

ST ELIZABETH'S HOSPITAL

F A DULAK Ozena

II ednesday Afternoon

ILLINOIS EYE AND EAR INFIRMARY
A LEWY E BLONDER D DOSEFF J PROHONIA and
FRANK J PISZKIEWICZ Presentation of clinical cases

and talks on interesting subjects

J CANALOR G Woonerf M Hoerree and B
RESTER Interesting cases talk on neasl sinuses discussion of anatomy of temporal bone lantern slides

RESEARCH AND EDUCATIONAL HOSPITALS

| PRESEARCH Complications of middle ear infections

SHERMAN L SHAPIRO Neuro otology RUSH MEDICAL COLLEGE

Thouas W Lewis and Richard Watkins Causative factors and results of treatment of vasomotor rhinitis with foreign protein

ST ANNE 5 HOSPITAL

JERRY HAYDEN Traumatic fistula of Stenson's duct car
cinoma of aryepiglottic fold laryngeal papilloma

Thursday Morning

ALBERT MERRITT BILLINGS HOSPITAL

J R LINDSAY Septic citis and lateral sinus thrombous

GRANT HOSPITAL
GEORGE DENNIS FRANCIS L LEDERER S H SOBOROFF
and GEORGE F McIntyre Operations and demon
stration of cases

MERCY HOSPITAL

Symposium Nasal Accessory Sinuses
HERBERT NASH and R. KERWIN. Anatomy and physiology
of nose and accessory, sinuses

G J MUSCRAVE Demonstration of Proetz method of visualization showing pictures Ferris Smith operation C H CHRISTOPH Manillary sinuses intranasal radical G T JORDAN Caldwell Luc operation

MOUNT SINAI HOSPITAL

JOSEPH C BECA, ALFRED LEWY JACOB LIPSCHUTZ S M MORWITZ FRANCIS LEDERER M R GLITMAN M GLATT I FISHMAN M KRAMFR AND A HOLLFYDER Climes with special reference to plastic surgery and treatments about the heid and neck NORTHWESTERN UNIVERSITY MEDICAL SCHOOL

L B AREL B J ANSON J GORDOV WILSON and assocates Reconstruction of tonsils stapes petrous bone J G Wilson and B J ANSON Reconstruction of bose pathology in cases of deafness. Motion pictures of vestibular reaction

J F DELPH Simplified caloric tests'
J GORDON WILSON Spontaneous nystagmus in lesions
of the brain

E L Ross Totic reactions in animals

RESEARCH AND EDUCATIONAL HOSPITALS
NATHAN H FON and JOHN W HARNED JR Rhinologic

surgery allergy in relation to otolaryngology
ST JOSEPH S HOSPITAL
AUSTIG A HAYDEN Conservation of hearing mustoid and

SOUTH SHORE HOSPITAL

JOHN STANTON Management of acute mastorditis

Thursday Afternoon

COOK COUNTY HOSPITAL

NORMAN LESHIN Interesting cases with methods of

examination and diagnosis and endoscopy

Samuet Pearina Carcinoma of the larynx bronchos

copy esophagoscopy

RESEARCH AND EDUCATIONAL HOSPITALS
FRANCIS LEDERER and N T PATTENGALE Cancer of the
ear nose and throat

RUSH MEDICAL COLLEGE
GEORGE E SHAMBAUGH IR and LINTON WALLNER The
treatment of deafness

ealness
Friday Morning

CHILDREN S MEMORIAL HOSPITAL
GEORGE LIVINGSTON Complications of ear infections
Paul Hounger Bronchoscopy in children

COOK COUNTY HOSPITAL

T C Galloway and H E Davis Selective treatment in malignancy about the head J Lifschutz Pacumography

GRANT HOSPITAL

CEORGE DENNIS FRANCIS L LEDERER S II SOBOROFF and GEORGE F McIntyre Operations and demors to turn of cases

MOUNT SINAI HOSPITAL

JOSEFH C BECK ALFRED LEWY JACOB LITSCHUTZ S M MORWITZ FRANCIS LEDERER VI R GETTAMY M GLATT J FISHMAN M KAMER and A HOLLENDER Clinics with special reference to plastic surgery and treatments about the head and next.

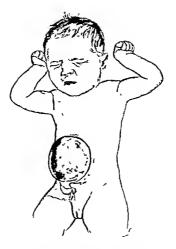
Friday Afternoon

RESEARCH AND EDUCATIONAL HOSPITALS
A R HOLLENDER Physical therapeutic methods
W THEUBALD Nasal accessory sinus disease

PAUL H HOLFIGER Bronchoscopy and esophagoscopy

RUSH MEDICAL COLLEGE

DANIEL B HANDEY and E L CHAINSAT Conditions producing timulus evaluation of methods of treatment



Drawing made in color from subject \ote blui h mass covered by shimy translucent membrane. At the lower pole of the mass the ligated stump of the until iteal cord i shown.

Congenital Umbilical Hernia - Julius Jarcho



Drawing made in colors from subject. Note blut h mass covered by ships translucent membrane. At the lower pole of the mass the ligated stump of the umbalical cord i shown.

Consental Umbilical Hernia -Julius Jarcho

or even to 10,000 deliveries, several thousand of such cases must have occurred in Europe in the last 50 years A review of the literature, however, shows that only a few more than 100 cases have been reported It is probable, he concludes, that most of the children with congenital umbilical hernia are stillhorn or die soon after birth and the cases are never re ported It is probably true also that many such infants are delivered by midwives and are never seen by a physician, much less hy a surgeon If this is the case in modern times. it was no doubt still more true in the earlier centuries This explains why umbilical hernia was not recognized as congenital by the earlier writers

In 5,017 successive deliverus at the Sydenham Hospital, New York City, resulting in 5,079 hirths, of which 4,910 were hiving children and 109 were stillborn, only 2 cases of congenital umbilical hernia are recorded. The hirst is the case I am reporting, the second, while of sufficient size to draw attention, was not so formidable as to require an immediate operation

In an obstetric practice of 30 years, in the early days of which the author delivered the patients in their own homes and took personal care of the newborn, small umbilical hernias after separation of the cord were not very uncommon, and were invariably cured by strapping with adhesive plaster

Thus one may fairly assume that, if the cases had heen followed up, small hermations at the umbificus would be found to have occurred much more frequently than the hospital records would indicate. One thing, however, is certain—that of massive herma only this rease has heen observed at the Sydenham Hospital, the only other hermation of sufficient size to be noted on the chart not having been extensive enough to demand prompt surgical interference.

REPORT OF CASE

L. C., while, aged 17 years, secundipara, was admitted to the Sydenham Ho-pital Vaj 3, 1932, in active lahor. She gave a history of one previous pregnancy which went to term, when, at the age of 16 years, she was delivered of a normal female child, who is living and well



Fig. 1 left. Frontal view showing defect in abdominal wall at umblical area. Herina of the liver—At the lower pole of the herinal mass may be seen the tied stump of the cord Taken 4 hours after birth

Fig 2 Same as Figure 1 Lateral view

The patient was delivered spontaneously at term of a living female child, weighing 6 pounds 14 ounces

Case report of Baby C The child was born spon taneously at term A large defect was found in the abdominal wall, through which a dark red, blush mass protended (frontispiece) This was covered by a thin, thiny, translucent membrane, at the lower pole of which the cord emerged This membrane, or hermal slac, continued with the covering of the umbitcal cord The child was otherwise normal (Figs. 1 and 2)

Diagnosis massive herma into the umbilical cord fhe dark bluish content of the herma was assumed to be the liver. This assumption was corroborated 12 hours later by operation

A vertical incision was made through the translucent membrane, i.e., the hermal sac. The entire sac covering the liver was removed down to the edges of the abdominal defect. The six at the edges of the defect was incised and dissected until the fascia was reached. The liver was adherent to the surrounding tissues, and was separated by sharp and hlunt dissection. Considerable heeding occurred from the liver tissue. Several sutures were put in the liver for hemostasis and the organ was gently replaced into the abdominal cavity. A number of silk tension sutures were taken through the skin, fascia, muscle, and peritoneum. Traction was exerted on the tension sutures to facilitate the replacement of the liver into the abdominal cavity.



Fig. 3 left. One month after operation. Showing healthy child Note irregular abdominal scar.
Fig. 4 Shows well developed healthy child at the age of to months. Note strong abdominal wall.

and to approximate the edges of the peritoneum which was then cloved by continuous plain eatgut suture. The fasca was approximated with interrupted chince gut suture. The tension sutures were tied and interrupted sill sutures placed in the skin between them. In the first days following operation normal saline solution with 5 per cent glucove was given intra-tenously and by hypodermocks to provide fluids after which the child was fed on breast milk and made a sutsfactor, gain in weight. She was discharged in good condution at the age of 1 month (Figs. 3 and 4)

This child was ob cried up to the age of 3 years and 1 month. On last examination (Fig. 5) she was found to be a health, sturdy child. The operative scar was strong and there was no age of recurrence of the herma. The mother has since had a third pregnancy with normal labor giving birth to a healthy male child.

The cause of congental umbulical herma is now generally considered to he the failure of the primitive intestinal loop to withdraw mito the abdominal cavity toward the end of the third month of embryonic file. Normally between the second and third month of embryonic development, this primitive loop develops within the umbilical sac and outside the abdominal cavity. By the end of the third month, the intestines normally are drawn into the abdominal cavity. However, if this falls to occur, the child is born with what Sir Arthur Keith calls "an uncured bernia at the navel," which may result in so large a defect in the abdominal will that a



Fig 5 Shows well developed healthy and intelligent child of 3 years and 1 month.

large portion of abdominal viscera becomes hermated before birth

Decasing Niebuhr's case, C. P. Baniem notes that the embry onic gastroduodenal loop from which the liver and pancreas develop is never normally contained within the unbilical sac, so that if the liver is included in the sac when the child is horn it must have been drawn down in a later period of fetal life, probably due to "a slow stretching of the ligaments of the liver."

What factors are responsible for the failure of the intestines or liver, in these cases, to withdraw normally from the cord into the abdominal cavity is not known with certaint. Bergglas has discussed vanious hypotheses in this connection. Until rather recently the view has received general acceptance that this failure is due to the pathologic persistence of the vitelline duct, but against this concept its now urged that this duct has already dwindled down to a thin thread in the nith week of embryo halfie when the embryo is only 5 to 7 millimeters long, whereas the development of the plus sologic umbilical open mg is not observed until the embryo is 30 to

40 mullimeters long Hence it cannot properly be related to the vitelline duct, nor would persistence of the latter explain the prolapse of large intestinal loops, liver, spleen, pancreas, etc. On the other hand, attempts have been made to relate it to defects of the abdominal wall, it has been claimed that the part of the hermal sac where the liver lies corresponds not to the dilated umbilical cord but to the supra-umbilical portion of the abdominal wall, which in these cases is faulty in its development

Bergglas, while attaching importance to this view, thinks that an inhibition of the growth of the abdominal wall could not alone account for the presence of abdominal organs in the sac He draws attention to a second factor of very great importance, namely, a marked disturbance in the relationship of the growth process of the abdominal cauty and that of the abdominal contents Through lack of correlation, the cavity is too small and the visceral content too large This disturbance of correlation would occur between the third and the tenth week, which represents the termination of the teratogenous period. The rather long time between these two periods would account for the existence of two types of congenital umbilical hernia that are observed, namely, one with an avascular membrane, which also covers the divergently coursing umbilical vessels, and another type in which the sac is composed of peritoneum The first type is the commoner, and it is in these cases, which constitute the great majority, that immediate operation is of the greatest importance, for if no operation is carried out, the avascular membrane will become necrotic and the child will die Other possible contributory factors bindering the abdominal organs from entering the abdominal cavity are hyperlordosis of the spinal column, and anomalies of the mesentery

The presence of other associated anomalies or malformations is not infrequent in these cases. Arthat found these expressly mentioned in 20 of the 160 cases he collected, in all these cases the children were stillborn or died shortly after birth. In 1930 Gruber described 5 anatomical specimens showing congenital umbilical hernia associated with other mal-

formations Kleiner (1930) reports 2 cases of this kind, Smith (1932) 4, and Krumm (1937), Caffier (1933), and Ginglinger (1935) 1 case each

In cases of this type an etiological factor has been sought in heredity, and there has been a widespread belief that congenital hernia in general is inherited and may run in families. In the case I am here reporting neither parent showed any signs or gave any history of congenital hernia, and, as has been noted, 2 other children in the same family were entirely normal, only the second of the 3 children exhibiting this malformation. One may, perhaps, emphasize the fact that all three pregnancies, labor, and puerperium were entirely normal with the exception of the congenital anomaly presented in the child of the second pregnancy.

A review of recent cases shows that the histories do not indicate any hereditary tendency to herma of any kind in the families in question. Moreover, in most cases the pregnancy and labor are entirely normal, without any illness or trauma to explain this fetal maldevelopment.

As a rule, except in cases of very small congenital umbilical hernia, diagnosis presents no difficulty, the condition being self-evident as soon as the child is delivered. The hernial sac, which may consist of peritoneum, thin layer of Wharton's jelly and amnon, is often translucent, as in the case here reported, so that the contained viscera may readily be seen through it. The small intestines are usually present in the sac, portions of the large intestines are often included, and in some cases, as here, the liver too, or a considerable portion of it.

Among the 109 cases of congenital umblical hernia tabulated by Altpeter, the liver was in the sac in 31 instances. This was true also in 14 of the 46 more recent cases reported since 1929

A few instances have been recorded in which the sac had ruptured and the intestines lay free on the abdominal wall. Massabuau and Guibal reported such a case, and collected 22 similar cases from the literature. In some of these the sac was completely absent, in others only vestiges remained, while in still others.

there was merely a tear in the sac Their collection does not include any of the three early ones of this type reported by Hey, nor the recent case of Krumm (1931) In the latter there was no hermal sac, and the liver as well as the intestines lay free on the ab dominal wall Other congenital deformities were present and the child died in 18 hours without operation

The presence of an umbilical hemia even though it be a large one does not often affect the course of labor Stockel notes that this is because the parts are soft. If however, the umbilical cord is short it will interfere with labor. In most of the instances reported it is expressly noted that labor was normal and delivery spontaneous as in my own case But that the umbilical hernia may occasionally eause some obstruction to labor is shown by a recent report from McCaughan, who writes

"The delivery proceeded normally until the level of the umbilious was reached and there it was definitely retarded. The baby was breathing so no effort was made to finish the delivery for several minutes. When pressure on the abdomen and slight traction failed to deliver the buttocks, a hand was slipped along the baby's abdomen, in the belief that there was probably a short cord preventing normal delivery, and the hemia was encountered. The newborn was flexed to right angles at the hip with head and shoulders across the mother's symphysis, and delivery easily accomplished "

While it is probable that in olden times in fants born with a large umbilical hernia died soon after birth as the statements of Pare and Hamilton would suggest some of those with small hernias undoubtedly survived carrying their hernias into childhood or even into adult Unquestionably many of the infantile umbilical hernias mentioned by the earlier writers were actually of congenital origin

One of the early methods of treatment appears to have been the application of a protective bandage without any attempt to reduce the hernia Aribat lists some cases of this type, and in all probability this method was employed by many a midwife when the hernia was relatively small Later on, various conservative methods were employed, in

which the hemia was reduced and the reduc tion maintained by use of adhesive plaster or a compression bandage or by some method of disposal of the sac and closure of the ab dominal wall

In modern days however, radical operation is almost universally considered the safest procedure in cases of large or massive hemia Its essential features as stated by I raser, are ' incision of the sae, separation and reduction of the contents, and closure of the abdominal wall " the exact technique depending upon the conditions found in the individual case and the judgment of the operator

Cullen states that in all cases of congenital umbilieal hernia except the very smallest, radical operation should be done at once He points out that even if the intestines can be easily replaced by taxis within the abdominal eavity the thin walled sac still persists, and as its walls are only amnion and peritoneum, they are likely to tear, and there will be

danger of peritoritis

Pybus points out the danger of strangula tion of such a sac if it is not removed imme diately by radical operation There is also the possibility of its contents being injured when the cord is tied. Wherever the condition is amenable to operation he favors radical removal of the sac and cord, followed by closing of the enlarged umbilical ring. He has seen this type of malformation associated with ectopia of the bladder or imperforate rectum

Notwithstanding a certain percentage of fatalities after radical operation, in the great majority of cases the child's best or only hope hes in this procedure

Cumston points out that if these hernias are not operated on immediately after birth, there is danger of desiccation occurring, and becoming the starting point of infection and inflammatory attacks in the abdominal vis cera If operation is carefully performed at once, it is his opinion that babies will stand the operative shock very well According to von Reuss and Parmelee, even where the sac has ruptured, an immediate operation may result favorably

That radical operation is growing in favor and is giving an increasing percentage of cures is evident from a comparison of recent statistics with those of an earlier date

In only 68 of the 160 cases (40 per cent) cited by Aribat in 1901 had the radical operation been done, resulting in 47 recoveries, while of the 100 cases tabulated by Altpeter since 1000, 91 (90 per cent) had been operated on by a radical method with 69 recoveries Of the 46 cases reported since 1929, all but 11 were submitted to radical operation Four of these 11 cases were stillborn, 1 died immediately after birth, and 1, 18 hours after birth (with other congenital malformations), 4 were treated by a conservative operation, and t by Ahlfeld's alcohol method child recovered and was in good health at the age of 7 months when it was accidentally killed Of the 4 children treated by conservative operation, 3 recovered, 1 being reported as well at the age of 8 months

Among the 35 cases in which radical operation was done there were only 5 deaths. Of those recovering after operation, 5 have been followed up for more than a year The longest follow-up reported is that of Vogel, whose patient is entirely normal with the scar well healed at the age of q years Ludwig reports 2 cases followed up 21/2 and 51/2 years, respectively Gordon reports a child living and well 3 years after operation and Freshman a case well at 31/2 years Of the 45 cases in which the liver or a portion of it was stated to be hermated, 11 recovered, this includes the case of Ludwig followed up for 21/2 years In Niebuhr's case with both liver and gall bladder in the hernia, the child was well a months after radical operation

Undoubtedly best results are obtained by radical operation within a few hours after birth Newborn infants tolerate operation and anesthesia remarkably well Friedrich, emphasizing this point, states that in his cases, the infant showed normal gain in weight after operation. In one of these the infant was premature and had an extensive hernia, yet rallied well from the operation and progressed as satisfactorily as any premature infant. At 4 months of age it was entirely normal, but died later of pneumonia.

If, however, the child is born outside the hospital and in some isolated community

where it cannot be sent to the hospital immediately, a conservative method of treatment may be the only one possible, and instances are on record in which the results have been

surprisingly good

In 1899, Ahlfeld described a method by which the hernia was reduced as far as possible under light narcosis, after careful cleansing of the hernial sac and surrounding skin, and then alcohol compresses applied and covered by a bandage. In the first case he treated the liver was present in the hernial sac and complete reduction was impossible, vet the child thrived without operation, and a year later the scar was excised and the wound closed This patient was known to be living and well at the age of 15 years Few surgeons, however, would allow a case of this kind to go without operative intervention today With a small hernia palliative measures may result in cure, but when the hernia is massive, radical operation is imperative and must be done without delay As Dott graphically puts it "The child should pass straight from the womb onto the operating table "

SUMMARY AND CONCLUSIONS

- 1 Massive congenital umbilical hernia is a rare surgical condition requiring immediate radical operation in the first hours following birth
- 2 The literature on congenital umbilical herma is reviewed
- 3 A case is described in which a massive congenital herma of the liver into the umbilities cord was successfully treated by radical operation 12 hours following the birth of the child
- 4 Operative intervention and anesthesia were remarkably well borne by this infant
- 5 The technique of operation employed in this case is described
- 6 No grounds are found for a belief that congenital umbilical hernia is an inherited affection, or one that runs in families
- 7 The case herein reported would refute the assumption that congenital umblical herma is an inherited affection, and the survey of the literature would indicate to my mind that there is no ground for such popular concept

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THE INITIATION OF RESPIRATION IN ASPHYXIA NEONATORUM

A Clinical and Experimental Study Incorporating Fetal Blood Analyses

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THE initial gasp after birth (Fig 1) is normally a vigorous inspiratory effort that opens the airways and some of the alveoli of the lungs It is the most important event in every life, and is quite distinct from subsequent respirations Once breathing, however irregular and shallow it may be, has developed, effective means of augmenting it are available. But there is no one generally accepted measure for initiating the first inspiration. If this does not occur spontaneously, the life or death of the child depends upon the measures employed

The human fetus makes rhythmic respiratory movements in utero during the latter months of pregnancy The onset of true respiration is believed to be caused by chemical rather than by physical factors. An explanation of this phenomenon satisfactory for our purpose is, that immediately after delivery, the placental circulation is markedly impaired by the contracting, retracting uterus. This results in a diminution of the oxygen supply to the baby and a marked increase of the carbon dioxide tension in the blood which stimulates the respiratory center to action We are all born in a condition of apnea, but it is only when this state persists for an unduly long period of time that there is cause for alarm. In the majority of prolonged apneas the constant increase in the carbon dioxide tension plus the measures employed by the obstetrician result in an inspiratory gasp, and apprehension is relieved More and more often this favorable outcome is not experienced so easily-sometimes, not at all It is in an effort to face this problem that this paper is presented

We shall deal only with severe cases of respiratory depression and asphysia Clinically most of them correspond to what is known as asphyxia pallida, which term will be frequently employed. At other times we shall use the word stillborn indicating in either case a baby in a state of shock, very pale with a relaxed musculature and absent superficial reflexes, which has not breathed, but in which the circulation persists. As far as treatment is concerned there is another class of babies those which are so deeply narcotized and anesthetized as to be in serious danger Although these are not in shock and are blue rather than white, such a severe degree of depression presents a problem almost as serious as that of true asphyxia pallida

Since the literature is replete with studies of the etiology and pathology of asphyxia neonatorum, these phases will not be dwelt It is important, however, to discuss briefly changes in the blood which are found in asphyvia neonatorum. It is only when such studies, at least as far as the oxygen content is concerned, are furnished that a true picture of the gravity of a case can be obtained, and the success or failure of the method of resuscitation properly evaluated Eastman has shown that in severe degrees of asphyxia neonatorum there is a reduction in the oxygen content of the fetal blood to extremely low levels He has shown also that the serum

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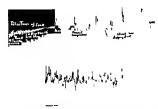


Fig. 1 Tracing of the first gasp and subsequent resums tory progress of ability horse pointanously of a mother to whom no drugs or anesthetics were admin tered. Tracing commences 12 seconds after cliever, the gasp-occurs about .0 seconds late: iffect of peripheral stimulation is clearly shown. Jower part of graph obtained 1/5 hour later. W though the respirations are adequate for lung ventilation they are still rerigizit.

hydrogen ion concentration is markedly re duced there being at the same time a considerable increase in the earbon dioxide ten sion with usually a moderate decrease in the carbon dioxide content. When the latter of eurs there is always an increase of endogenous lactic acid sometimes to very high levels (45 to 90 milligrams per 100 cubic centimeters) Levels above the latter figure are practically always associated with fetal death. For sev eral years previous to the publication of Eastman s studies we conducted similar investigations Eastman's work was performed on blood from the umbilical artery and year as well as blood from the maternal vem. He re ported findings on normal and asphyxiated babies together with those born of deeply anesthetized mothers. Our studies were on the umbilical vein blood of normal and as physiated babies The first group consisted largely of spontaneous births while the second was composed of many types of deliveries the complicating effects of anesthesia and narcosis, as far as possible being avoided The blood obtained under oil by a special tech nique, and analyzed by methods similar to those of Eastman, furnished results which paralleled his to a very close degree \n inter esting finding in our series was the low oxygen

content in some babies which appeared to be breathing fairly well (Fig. 10) while in a fatal case (Fig. 3) the oxygen content was below a volume per cent

Pressure from the lasty has forced the profession to increase the use of analgesia and anesthesia. In many hospitals few labors are carned through with no drugs whatever I rom a clinical point of view, it must be ad mitted that although the incorrect or ex cessive use of drugs may cause anxiety, as a rule such babies respond after a more or less prolonged period of apnea Occasionally, honever, a depression is encountered which is so deep that after a few shallow respirations the apnea recurs (1 ig 2) and such babies can be kept above only with the greatest difficulty The important point is, that although few lives are lost as a result of the use of drugs per se such babies cannot stand much addi tional asphyxia If in such cases obstruction occurs in the cord, or there is partial separa tion of the placenta, compression of the head with forceps, etc., plus a long deep anestbesia, many of these babies will die They would often reco er from the narcosis or the asphixia alone but are overwhelmed when one is superimposed upon the other If a traumatic delivery with deep anesthesia is anticipated or other causes of asphysia are present or likely to occur it would be safer to dispense with drugs

THE INFLUENCE OF DRUCS ADMINISTERED
TO THE MOTHER UPON THE ASPHYLIA OF
THE NEWBORN

It is a poor use of drugs that in sparing the mother pain causes her to bear a babt that will not breathe. Resuscitation has an important place in the technique of the obstetrician but it is best that it should be needed as seldom as possible. It is not always successful.

All anesthetics hypnotics, and narcotics diminish the sensitivity to stimuli. But these drugs vary widely in the relative degrees to which they depress sensitivity to the various kinds of stimuli.

The two most important forms of stimuli that come into consideration in partuntion are first, those irritations of afferent nerves that produce pain, second, those chemical



Fig 2 Narcottzed haby slowly relapsing into apine a Respirations become progressively more shallow and the expiratory base line steadily falls. This indicates a decrease in muscle tions and the closing of great numbers of alve the as the chest wall collapses. This haby responded to earbon dioxide oxygen inhalations after respirations were remittated.

stimuli that act upon respiration. In general the volatile anesthetics decrease sensitivity to afferent stimuli, while everting comparatively little influence of a depressant character upon respiration unless administered in excess. Morphine (the drug traditionally rehed upon to relieve pain by diminishing sensitivity to afferent stimuli) exerts a more powerful depressant effect in decreasing the sensitivity of the respiratory center to stimulation by the gases of the blood

Obviously for use in partuntion the drugs employed should have a maximum capacity to protect against pain with a minimum tendency to depress respiration. The failure to consider this point is probably due to the fact that until comparatively recent years the drugs chiefly employed were the volatile anesthetics. Beginning some 20 years ago, however, scopolamine with morphine came into use, and the more recent introduction of the barbiture acid compounds has led to a widespread and increasing practice of prolonged narcotization of the mother instead of temporary anesthesia

Experience demonstrates that most drugs administered to the mother pass also to the Consequently the decrease of the sensitivity of the mother is accompanied by a decrease in the sensitivity of the respiratory center of the child to those chemical stimuli that normally induce and maintain respiration How important this point is in actual practice is strikingly demonstrated by the figures recently published by Irving and his associates showing that, of all children born of wholly undrugged mothers, less than 2 per cent fail to breathe spontaneously, on the other hand with some of the drugs now frequently used, the depressant effects are so powerful that a large minority, or even a

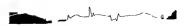


Fig. 3 Tracing of an infant admitted after attempted forcers delivery at home. Ether anesthesia was used in a long difficult high forceps delivery, baby was limp and white and showed only a faint cardiac impulse. Every available method of resuscitation was employed without any improvement in color or tonus weak respiratory of forts occurring, at irregular intervals however. Two minutes after delivery this tracing was obtained with the pneamograph and treatment was continued. Patient died or minutes later. Autopsy was refused. Blood obtained from umbilicit vein immediately after delivery showed the following oxygen content, of 8 volumes per cent pH 6 97.

majority (35 to 65 per cent) of the children born under their influence fail to breathe immediately at birth. Doubtless no obstetrician would admit that the use of such drugs had in his experience, actually cost the life of a child, but considering the extent of the present use of powerful respiratory depressant drugs in labor, there can be no question that there is a considerable mortality from this cause. This does not take into consideration those babies which are successfully resuscitated, but which later develop pneumonia from a continuance of partial atelectisss.

As an approximation the amount of protection against pain in relation to depression of respiration from drugs and gases in common use is as follows paraldehyde, nitrous oxide, ethylene, ether, chloroform, barbiturates, scopolamine-morphine, morphine When morphine is used, it should be in moderate dosage and should not be administered less than 2 bours before delivery (Fig. 9) We have found experimentally and by chinical experience that babies are not easily depressed by the barbiturates, but if deep depression exists as the result of excessive dosage, the response if any, to the administration of carbon dioxide is poor Liber is relatively safe unless present in the blood in high concentration for a long period of time. Nitrous oxide is of little danger to the baby if 15 per cent or more of oxygen is administered with it. If the oxygen ratio is much below this, however, asphyxiation of both mother and baby will occur The value of paraldchy de 15 becoming generally recognized, no other available drug is so harmless

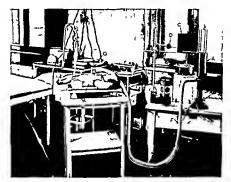


Fig. 4 Pneumograph connected to recording apparatus. (Baby a days old) of Spirometer with scribing point in contact with revolving drum & clamp in place on small rubber tube through which air is forced into the system c recording drum d timer for recording seconds e electric timer f rubber tube e connection to which rubber bag is attached k hinged plate under which is indiatable rubber bag contacting front and sides of chest and abdomen. Note: When taking tracings immediately after delivery the pneumograph should be nearer the delivery table so that the cord need not be cut unless at is very short

OLDER METHODS OF RESUSCITATION

Artificial respiration Moncrieff states ' Artificial respiration in the sense of moving the chest even gently stands condemned in any form until respiration has begun, and once a breath has been taken it is no longer neces It does not reflect credit on the profession that this measure still is advocated in most of the standard textbooks of obstetrics Artificial respiration depends principally for its effectiveness upon compression and a resulting decrease in size of the thoracic cavity If the alveoli contain air, some of it is expelled so that when the pressure on the chest is re moved, provided obstruction is not present, the elastic recoil plus the tonus of the dia phragm bring about an inspiration of air It is of no avail to compress the unexpanded. solid, fetal lung, for upon releasing the pressure, air will not enter the dense viscus In serious cases tonus is almost entirely ab sent, and if a little air has already entered the bronchial tree, compression further restores atelectasis

Artificial respiration in the Summary babies under consideration is condemned for its futility exposure to cold, and the risk of The peripheral stimuli which are incidently, involved in the various methods, are quite useless because they do not reach the The necessary stimuli must be chemical rather than physical

Mouth to mouth insuffiction This method of resuscitation dates back to antiquity The principle involved is similar to that employed in the pulmotor and lungmotor Mouth to mouth insufflation carries serious risk of in fection and depends largely for success on the experience and skill of the operator The latter's mouth serves as a mask and air is forced into the baby It usually enters the stomach, but if sharp, short, repeated puffs are made, a little may enter the trachea, es pecially if the head is held in hyperextension



Fig. Manner of injecting a respiratory or cardiac stimulant into the umbilicial vein. The cord has been clamped and cut about 8 inches from the umbilicia. To facilitate the insertion of the needle if possible a dilated or bulbous portion of the vein should be selected. It is well to withdraw a little blood in order to be sure that the needle tip is within the lumen.

Some observers believe that the carbon dioxide in the exhaled air which is between 3.7 and 5.5 per cent may be responsible for a favorable result This is most unlikely. The oxygen (11 to 17 per cent) is of some value. This is indicated by improvement in the cardiac impulse sometimes noticed though no respirations occur When a response is obtained, it is more apt to be due to the fact that a faint reflex is produced by the sudden distention of the larynx and trachea In severe cases this reflex is not present so that the principal benefit that might be derived is from bringing into play the Hering-Breuer reflex by a marked distention of the bronchial tree. The pressure of air necessary to affect the stretch receptors, however, is likely to injure the

Summary In the hands of the novice it is always dangerous, and even after long experience, the possibility of ruptured alveoli and infection is great Occasionally a baby is saved by its use. It should be reserved, boxever, as a last resort after all other methods have failed.

delicate lung tissue

NEWER METHODS OF RESUSCITATION

In order to evaluate intelligently the methods at present available to initiate respiration it is important to describe briefly certain experimental work performed by us

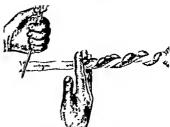


Fig. 6 Stripping of the umbilical cord. It is compressed between the innegers distal to the point of injection, and the fingers are then moved toward the umbilicus. The amount and rate of introduction of a drug into the general circula tion are regulated according to the speed at which the fingers are moved.

It was done in an attempt to answer the following question Can the alveoli be safely opened and made available for gaseous interchange by means of gases under pressure in the trachea and bronchial tree (intrinsic pressures). Conditions closely approximating those found in the living but non-breathing newborn can be obtained by using true stillbirths Our material consisted of full term stillbirths in which death occurred less than 3 hours before delivery These were immediately intubated with a leak-proof tracheal tube and the bronchial tree distended by oxygen Five cases are reported here, a number sufficient to answer the question just propounded The first was intubated for 20 minutes, a continuous pressure of 18 millimeters of mercury being used, the other 4 with the same pressure applied intermittently -4 seconds on and 3 off A pressure as high as 18 millimeters was used in order to insure the thorough distention of the bronchial tree The babies were immediately subjected to autopsy and the lungs in all 5 cases presented grossly no evidence of aeration They immediately sank when placed in water This is the more remarkable if we bear in mind that during the insufflation the thoracic cage and. to a lesser degree, the abdomen, were rhythmically expanded and deflated in a manner similar to normal respiration. When these



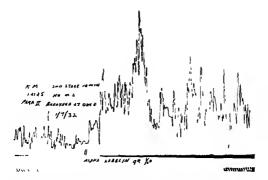
Fig., Blood pressure response of the cat to injection of lobeline hydrochloride 1/20 grain into the femoral vein invital was given intrapentioneally in sufficient amount to prevent pain and struggling. Note the transient rise of

and other cases in which the pressures ranged from 18 to 3 milhmeters of mercury are published the microscopic findings and con comitant photomicrographs will be given in detail It is sufficient to state that only rela tively few alveoli contained air. When air was found the surrounding alveolar wall was usually torn often communicating with other alveoli similarly damaged. Many were tilled with blood In 2 cases air blisters beneath the pleura were present, indicating extensive damage The pressure was evidently too great for the friable fetal lung and resulted in senous damage, yet it was not adequate to aerate the lung and open the alveoli It is logical to assume that a lower pressure, un likely to damage the tissues, would be less effective in overcoming atelectasis. As a result of our experiments we can positively state that although the bronchial tree can be thoroughly distended the chest walls expanded and the diaphragm displaced the lung tissue itself cannot be adequately aerated even by pressures high enough to be injurious and destructive

Druker respirator The efficacy of the Druker respirator for respiratory depression in an adult or child which has breathed is beyond question. The important point in such cases is that alveoli are open so that, if respiratory movements are even an approximate prototype of the normal, air will enter and leave the alveolar spaces. Exposure is avoided, there is an absence of trauma and the rhythm is perfect. Although the respiratory movements are not exact duplicates of those controlled by impulses from the center, the imitation is close. pressure and increase of pulse pressure with subsequent slight fall below the base line. A return to normal is reached in a minutes.

The diaphragm is an important factor in respiration, but with the Drinker respirator the amplitude of its descent is much less than in normal re-piration In spite of this numerous reports are lavorable and show that good ventilation can be maintained. When this instrument is properly used, in moderate ly depressed babies, similar favorable results are obtained. We are faced with a more dificult problem in the case of the baby which has never breathed The collapsed lung of the newborn is a structure composed of the bronchial tree, alveoli, blood vessels, fibrous and elastic tissue. It contains no air and does not open suddenly when the chest is expanded, but, rather, in sections of varied extent With each early inspiration additional alveoli are aerated and, as this continues, more and more blood from the pulmonary artery circulates in the pen-alveolar capillaries Gaseous inter change between the alveolar air and the blood now takes place so that increasing amounts of Oxygen are carried to the center Roentgeno grams show that days and even weeks may clapse before the lung is completely expanded

Coryllos and Birnbaum found a pressure of 14 centimeters of water necessary to inflate the atelectatic lung of the dog. This pressure was required solely to overcome the cohesion between the opposing surfaces of the collapsed alveol. It does not take into account the additional pressure needed to overcome the resistance of the chest wall and diaphragm. This introduces an important principle, name 19, that the initial effort necessary to expand the lungs must be considerably greater than the subsequent efforts required to maintain the espansion and continue ventilation.



lig 8 K M No 1212, whigh 7 pounds 12 ounces, asstation 9 months, labor, 7 hours 30 minutes, accord stage 10 minutes No morphine or anesthetic was used. Delivery was spontaneous. Baby was in excellent condition breathed immediately Lobeline hydrochloride 1/20 (ram was injected 3 minutes after delivery for purposes of demonstration. This tracing shows a busby breathing irregularly but satisfactionly I few seconds after injection a tremendous increase in the amplitude of most of the respirations commences. These extensive excursions of the thoracic wall result in the aeration of many additional alveoli with a proportional increase in pulmonary ventiliation.

It should be clearly understood that we are only evaluating the use of the Drinker respirator for initiating respiration. Murphy, Wilson, and Bowman in 1931 reported the results in 35 infants treated with this apparatus In 1932 Murphy and Sessums reported a larger series of 66 infants who failed to breathe promptly at birth. After careful clearing of the air passages the instrument was adjusted to give a breathing rate of 45 per minute for one group and 35 per minute for the other The negative pressure employed was from 8 to 10 centimeters of water Analysis of the results reported by these workers is not impressive Fifteen of the 66 infants never breathed and 21 breathed before or during treatment only to die in the hospital though at least 13 of the 36 failures were premature, and most of these non-viable, the cause of death in as many as 15 full term or only slightly premature babies is reported as cerebral hemorrhage Tentorial tears were observed in 5 of the cerebral injury cases, each of which was a breech delivery, but no mention is made of the extent or location of the hemorrhage in these or the remaining 10, and, as cerebral hemorrhages are a common finding in asphyxial stillbirths (this condition being shown by Leff to be a result rather than a cause in most instances), death is not necessarily explained. In these deaths and others listed as being due to prolonged labor, prolapsed cord, etc., the important evidence as far as this method of resuscitation is concerned, namely, the extent of lung aeration, is not mentioned.

In 1933 Murphy and Bauer did report the results of postmortem examinations on the thoracic cavities of infants who died after treatment with a negative pressure of 8 to 10 centimiters of water. They were disappointed to find a high proportion of cases in which large areas of lung were unexpanded. They suggested, as a result of these findings, that better results would probably be obtained if a greater negative pressure were used. In view of these results and of others equally disappointing received in personal communica-

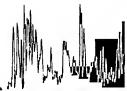




Fig o Response of a morphinized baby unexpectedly form o minutes after 1, grain of morphine sulphate had been administered to the mother. Belivery was spontane out. Yo anesthetic was used. Baby was folio but main frieted good tomas Cardiac implice was foor regular and friend form of the properties of the properties of the parameter of the properties of the properties of the parameter of the properties of the properties of the parameter of the properties of the properties of the depression often encountered in drugged babies. There are short periods of expursion panes. Such indiants unless treated vigorously suffer from a telectasis and are subject to neonatal potentions.

tions it is evident that the negative pressure should be increased. Serious damage, however can be inflicted by high degrees of negative pressure, since it is possible to expand the chest to such an extent as to rupture every alveolus in the lungs. It has been suggested that hetter results would be obtained if, in addition to a greater negative pressure an alternating positive pressure were substituted for the return to atmospheric levels. This is not difficult to accomplish and is undoubtedly an improvement. The objection, even if this is done that the patency of the air passages is not properly maintained can be overcome by the simultaneous use of a tracheal tube. The principal difficulty is that, even in conjunction with a tracheal tube and alternating positive pressure the initiating negative pressure necessary to expand the collapsed lung is greater than has yet heen suggested, and cannot be known until extensive experimenta tion has been performed. Assuming that the expansion is accomplished by an adequate but safe pressure it would then be important to diminish immediately the expansion force This would make a trained attendant a



Fig. 10. N. H. No. 1980) weight, \$ pounds \$ 0 mices rectation 9 months labor 40°s hours \$10°s min compliate sulphate \$10°s hours before delivery. Ether anesthesa was used. Delivery was by low forcerys. Bub braited promptly and although blue appeared to be in production. Training was started it second, after delivery \$1°s and \$10°s min started the \$1°s min started although \$1°s of principles in \$1°s min started although \$1°s of principles high delivery at \$1°s of principles \$1°s of pr

necessity. The respirator is cumbersome and expensive, so that even if the technique is eventually perfected it could hardly be available in many deliveries.

Summary The Drinker respirator as employed today has little if any place in the unitation of respiration in the newborn Piper, after years of use and observation with the Drinker respirator, came to the following conclusion 'This method of resuscitation' based upon the principle of a vacuum can be of no value in those cases either blocked by a nuccous plug or in which there is a dennite condition of atelectasis. On the other hand, we are convinced that the Drinker apparatus for infants is of great value for the reviving of the newborn mfant which has once had normal respiratory action' This is seen in prema-

tures who sometimes have syncopal attacks in the respiratory center, and deeply narcotized babies who breathe for a time and then relapse into apnea (Fig 2)

Lunguotors — pulmotors — resuscatators. These machines are of two types those employing intermittent positive pressure and those using intermittent positive and negative pressures. It is not within the scope of this paper to consider their value for the adult or the child which has previously breatbed, we are concerned only with the bahy which bas had no respiratory action and appears unlikely to breathe without definite assistance

For many years the idea of blowing air or oxygen into the lungs has appealed to science The earlier pulmotors were given an extensive and fair trial and, possibly, did save some lives They have been condemned on at least two occasions, however, hy eminent commissions appointed to investigate their claims, and are little used today. The damage inflicted on the living subject and the number of lives lost because of the delay in instituting other measures will never be known Brickley is quoted as having found tears and hemorrhages in the lungs of animals following their There is no question that many of the resuscitators on the market today are superior to the original pulmotors. They are safeguarded against excessive pressures, but the reasons which counsel their abandonment have not changed On March 14, 1935, an Luglish authority, Moncrieff, speaking before the Royal College of Physicians in London, on respiratory failure and resuscitative measures. stated "Positive pressure inhalatory methods involving the use of a mask and pump are unsafe in most instances and quite unsuitable" Most of these machines are clumsy and expensive and even if they were efficient, would not he commonly found in smaller hospitals, and would practically never he on hand in the home where the majority of deliveries still occur

Kresselman, Kane, and Swope have reported good results with a resuscitator which they designed and developed. By means of a tuhe running to the hack of the mouth, attached to a tight fitting rubher mask, repeated blasts of oxygen are injected under carefully

regulated pressures Its mode of action appears to be identical with that described under mouth to mouth insufflation without the disadvantages and dangers of the latter. In order to evaluate their work properly, detailed, microscopic studies on the lungs of fresh stillhirths treated with this machine and then immediately subjected to autopsy should he published. This also applies to any resuscritator which is claimed to open alveoli

It is not difficult to account for the good results reported by some clinicians in their experience with resuscitators. If the apparatus employs positive and negative pressures, as most of them do, it is generally demonstrated by means of a non-elastic bag made of rubherized fabric. The hag is inflated until it resists further distention and creates a back pressure which then actuates a reversing mechanism so that an aspirator is brought into play and suction produced. When the bag is empty, the aspirator is automatically shut off, and inflation is again instituted. The bag is thus successively inflated and deflated Inflation and deflation of a bag is deceptive, because the bag, unlike the air passages of the body, offers no resistance until full As soon as the inspiratory blast meets an obstacle in the air passages, it is automatically cut off and turned into expiration, thus efficient inspirations are not performed There follows a rapid clicking of the mechanism back and forth without any visible excursions of the chest and ahdomen Some observers believe that alveoli are gradually opened during this clicking process, but from our experiments on fresh stillhirths we are convinced that the alveoli cannot be opened in this manner

When the opportunity to try out a new resusciator presents itself, some obstetricians are likely to use it on baby after baby, which after delivery present a period of apnea, regardless of whether such treatment is really necessary (i.e., relaxed musculature, sbock, absence of reflexes, failing circulation). As comparatively few babies maintest these findings but, rather, a mild depression as the result of drugs and anesthesia, it is inevitable that the results will he good. An objection to the use of these machines is that valuable time is lost before such instruments are put aside.

The lapse of even one minute in the case of a secercly domaged recipitatory center sail result in further damage and may render the cells urreversible. Schmidt beheves this to be due largeby to the accumulation of products of incomplete oxidation. Once it has occurred, the full restoration to oxygen will fail to bring back functional activity because the altered cells are no longer able to utilize the gas.

Summary At times resuscitators appear to give results in cases for which they are not needed. They fail in the serious cases under consideration and are contra indicated if they employ suction, for if this acts at all, it tends to deflate the lungs and restore them to atelectasis.

Inhalmors The treatment of asphysia with an inhalator usually consists of the inhalation of varying percentages of carbon dioxide and oxy gen Oxygen not only nourishes but sensitizes the cells of the respiratory center, while carbon dioxide, if present in sufficient quantity, stimulates them Respiratory stimulation may be reflex or chemical This form of treat ment relies on the latter Without going deep ly into the chemical control of respiration it should he pointed out that, although a slight diminution in the oxygen content of the blood temporarily stimulates the center, a further diminution renders it less sensitive to whatever carbon dioxide is present. When this condition persists, oxygen should be restored as rapidly as possible, but, until this has been accomplished, an increase in the carbon dioxide tension will provide increased stimulation and largely compensate for the oxygen lack If the oxygen content remains relatively low for a long period of time, which is the case in the later months of gestation, a considerable increase in the carbon dioxide pressure, a nor mal finding during these months, may not be adequate to initiate or continue respirations. as it has been shown by Eastman that the fetal center becomes dulled or insensitive to considerably increased tensions of carbon dioxide In order to improve the function of the center the oxygen supply must be fully restored and, for a time, the carbon dioxide tension, already high, markedly increased It is, in part, upon these facts that the value of the inhalator for the poorly breathing baby is

based As a rule a mixture of carbon dioxide and oxygen containing to per cent of the former is sufficient to augment respiratory movements, but in some few cases in which the respirations are viry shallow, in spite of a high carbon dioxide tension, mixtures con taining as much as 20 or even 30 per cent should be employed for a short time. As the oxygen revivifies the center, less carbon dioxide is needed, thus it should be progres suchy cut down to 30 or 7 per cent.

As early as 1920 Henderson (15) advocated the use of such mixtures. On numerous occasions since, he and many others have elah orated upon the subject so that, as far as the asphywated but breathing baby is con cerned, inhalator therapy, when obtainable, has practically supplanted other methods. In such a case we rely on the infant inhaling the gases, thus producing stimulation as well as oxygenation of the center The inhalator has saved, and will continue to save, countless bahies, yet it can actually do harm. This statement is based upon the fact that the in halator is useless in a stillborn child, for, placing a mask over a baby's face, even when the gas is under pressure, will not assure its entering the lungs Valuable time is thus lost if the limitations of the inhalator are not appreciated

Summary The inhalator is the heat and safest means we have for saving the life of the asphynated but breathing boby, and is also of value as a neonatal treatment for the prevention of atelectasis and pneumonia. It is, however, of no avail in itself as a means furnituding respiration (Cases y and 10, Table 1)

Lary need insubation and insuffation. The digital mertion of a flexible rubber tube into the trachea has been practiced for many years, ease of introduction depending principally on the presence or absence of a laryngeal relex. If present, it indicates a comparatively mild asphyxia so that although insertion might be difficult, it is rarely needed. When the reflex is absent, there are no respiratory efforts and the skeletal muscles are markedly atomic Because of this such babies can be intubated with hittle practice—DeLee, for example, men tions a simple technique. In 1928 Flags and took should be a supple technique of the results of the state of the supplementations and the steeling of the supplementations.

tube into the trachea by means of a small electrically lighted laryngoscope. The tracheal tube is connected to a water manometer which is in turn connected with a supply of carbon dioxide and oxygen The manometer indicates the pressure of the gases in the tube and is so adjusted as to act as a blow-off valve if an excessive pressure is used. We have found that 12 millimeters of mercury is the highest pressure that can be used with safety Blackley and Gibberd have recently suggested a somewhat similar technique employing a rubber catheter instead of the rigid tube Although trauma may be inflicted if the lary ngeal reflex is present, in its absence both methods are easy and safe

The lungs of the stillborn are dark in color, do not crepitate, and sink in water With the tirst inspiration the thoracic wall expands and the diaphragm descends so that a disproportion is created between the thoracic cavity and the solid lungs In the absence of obstruction, air enters the bronchial tree and infiltrates into the alveoli. There is little or no negative pressure in the pleural space at this time, since insufficient disproportion between the lungs and the chest cavity exists Later, as a result of the rapid growth of the ribs and vertebral column, a real disproportion is present, which, because of the elastic recoil of the lung tissue, produces a definite intrapleural negative pressure

To most obsetricians intratracheal insuffiction has for its principal object the forcible expansion of the lungs. It has been previously stated that the alveoli cannot he safely opened in this manner. The preceding paragraph described nature's way of opening the lungs, which, in most respects, is at variance with the concept of using gases under pressure in the traches.

This does not mean that insufflation is not of great value. On several occasions we have observed that when oxygen is insufflated into the trachea, there is a definite improvement in color. If the insufflation is performed with a tight fitting tube and a pressure as low as 5 millimeters of mercury, the bronchial tree is distended, the chest increased in size, and the absorption of oxygen is even more rapid. Using this pressure and technique we kept a

haby alive for 2 hours although it never breathed and autopsy revealed no open alveoli This is of great significance Intermittent pressure is recommended by Flagg but Blaskley and Gibberd state that this is not necessary They feel that if respiration commences, expiratory movements against a positive pressure assist in the aeration of alveoli and to some extent are imitations of the valuable crying efforts Intermittent pressure is probably of value, however, as the rhythmic expansion of the bronchial tree may bring into play the Hering-Breuer reflex Although this reflex is absent in severe cases, it will return if the circulation improves sufficiently as a result of the absorption of oxygen by the mucosa lining the trachea and bronchioles

Summary Intubation is safe and easy to accomplish in the severely asphy stated baby, permitting thorough aspiration and providing an excellent airway Lissentially, it is the extension of an inhalator into the lungs. It should not be used in an attempt to open the alveoli by direct attack.

Titing boards Eve and Cornish have devised seesans on which the patient is laid and rocked through an angle of 30 or more degrees Henderson (14) in recent experiments on dogs found that the volume of air moved in and out of the lungs by this rocking method is much less than that displaced when the chest is compressed by hand As such pressure is useless when there is no air to expel, it would seem that the rocking method is of little or no value in mitiating respiration

Intracenous resuscitation. By this is meant the imitation or reinitation of respiration utilizing a substance injected into the blood stream. This method depends principally either upon direct stimulation of the respiratory center or the lowering of the respiratory center or the lowering of the response threshold so that a previously dulled center is rendered more sensitive to the prevailing carbon double in the blood. In 1928 one of us (RAW, 39) presented a preliminary report on the injection of a respiratory stimulant into the umbilical vein for the treatment of asphyxia neonatorum.

In the search for a satisfactory agent much time was devoted to the study of drugs comTABLI 1—SUMMAKY OF THE IMFORTANT FACTS CONCLENINC HII KISUSCHATION ON TEN NEWBORN INLANTS SUFFICIENT ALLEDA

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TABLE I—SUMMARY OF THE IMPORTANT FACTS CONCLRNING THE RISUSCITATION ON LEN NEWBORN INFORMER TABLE I—SUMMARY OF THE IMPORTANT PALLIDI—Communical

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Subsequent	COD 1%. DO 10%. DO 10%	Contrauous Os by fun net Spinal tap	Inhalations CO ₂ 7%- O ₂ 93% 5 meroles twice daily for 5 days	
Approximate interval before rhythmic breathing	ts hours		d and	
Auxiliary measures	ileo (halatuon 12 hours (100 p.m.) (20 s.m.) maate		Traches sound (Class) (Class) (Class) (Class) (Con 1967) (Con 1967	Or 93% for 5 manutes Re peated 15 min utes later (Combination technique)
Response	Miter fabre of persons are controlled and an extended an extended controlled and are cont	Deep inspiraton followed by deep irregular respirations	Sufficiency of body. West gas planned by the standard was several address of the sufficient of the suf	
Elapsed tume from strapping to fast mapara tion (seconds)	۰	e than	Ţ.	
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i	Infant	Term Em	Aver

monly deemed to be analeptics and respiratory stimulants, such as stry chinne, epinephine, caffeine sodio benzoate, atropine, ephedrine, etc. Either there was no respiratory stimulation following injection or so little that they would be of little use in a severely asphynated baby. Undesirable and dangerous side actions were often found particularly with the dosage increased in order to obtain more respiratory effects.

It is necessary to summarize the results of hundreds of animal experiments in different types and degrees of narcosis and aspbyxia in a short space. Only two drugs were found to be good respiratory stimulants Pyndine B -carbooic acid diethylamide (coramine) and lobeline hydrochlonde The former increased considerably the rate and ampbude of respiratory movements. On a number of oc casions it initiated respiration after the expermental production of apnea Frequently, however, severe and sometimes fatal convul sions occurred even when recommended dosage was used Moncrieff speaks of similar coovulsions in children, therefore we have oot felt justified in using it intravenously in the newborn These convulsions do not usually occur in adults and older children when the drug is injected subcutaoeously. No further coosideration was given to coramine as the subcutaneous injection of this or any other drug in stillborn babies is doomed to frequent failure because of the weak circulation and the consequent lapse of time which results between injection and effect. If a favorable result is to be obtained, within a few seconds after in jection, it is possible only by intravenous (Pentamethylentetrazol-metrazol and picrotoxin are known to be analeptics. In the case of the newborn extreme caution is advisable for these drugs are also convul-

There is general agreement among those who have had experience with lobeline that it stimulates respiration. There is some difference of opinion as to its effectiveness in severe degrees of narcoust and asphyxia. Competent observers (1, 6, 8, 10, 16, 32, 33, 35, 36, 37, 38, 39, 40) have reported more or less favorably, jet others (11, 18, 20, 22, 27, 28, 31, 34) advised against its use. We have given it a

thorough and impartial trial both clinically and in the lahoratory, using a preparation of loheline hydrochloride¹ The results as a whole have heen impressive, especially in

severe asphyxias Graphs of the apnea and early respirations of the newborn have not heen previously produced, yet they are absolutely necessary if we wish to have impartial and permanent evidence of the condition of a hahy hefore and after resuscitation As there was no reliable method for recording the respiration of the newborn immediately after birth, it was necessary to devise an apparatus for that purpose It consists of a receptacle in which the infant is placed immediately after delivery Movements of an infant's chest and abdomen are transmitted to a spirometer carrying a scribing point which in turn writes on a drum (Fig 4) By means of this apparatus it is possible to study, not only the effects of drugs and gases as resuscitant agents, but also the

effect on the baby of drugs and anesthetics

administered to the mother before delivery

Tracings can be started as soon as 7 seconds

after delivery and from dozens which have so

far heen obtained a few representative ones

will be presented

In the remainder of this article we shall prove by means of the aforementioned graphs that lobeline will heighten the respiratory efficiency of the normally breathing baby, that it will rapidly overcome respiratory depression due to morphine, that it will produce such a marked expansion of the thoracic cavity as to greatly diminish, if not entirely remove, residual atelectasis, lastly, that it will actually initiate respirations in serious asphysias The graphs of the latter condition are fortified by detailed protocols of the resuscitation of 10 cases of asphyxia pallida with concomitant fetal blood studies (Table I) The best technique of injection, blood pressure response, method of action, dosage,

In order to duplicate these results the drug must he introduced directly into the blood stream, a most rapid method for reaching the center Even in the hreathing child, carhon

and safety will he considered

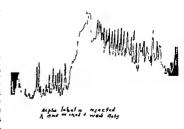


Fig. T. E. S. No. 12545, weight, 6 pounds x ounce, gestation, 9 months, labor, 10 hours. Delivery was specified by the property of the propert

dioxide administered with an inhalator finally reaches the center in this way (Its entrance into the lungs and passage through the alveolar walls is an intermediate step) Therefore, it is logical to introduce the stimulating substance directly into the blood if, as it has been previously shown, the lungs are solid In grave asphyxias the lingual death zone is a harrier to the passage of gases into the trachea The desired effect need be of short duration only because, if respiration commences and the airways are patent, a few inspirations will open up alveoli to oxygen and carbon dioxide Treatment is then continued as it would he on any asphyxiated but hreathing hahy

Any method of resuscitation should he as simple as possible. This is particularly true in obstetrics because so many deliveries take place in the home. One should also keep in mind the confusion and excitement that often attends the hirth of a stillborn child. The superficial veins are too small to he readily available, and injection into the longitudinal sinus or heart chamber are radical procedures and should not be lightly undertaken. The umbilical vein offers the most convenient place of injection. Only when the cord has



Fig 13—3.5 No. 13,44 weight, 7 pounds 12 ounces restation, or morths labor to hours—16 from morphise sulphate was given. Bother dolvers: Either arestheai was given. Delivery was difficult, by low forceps. Baby showed severe amplyrax, was timp and pale. However faint element as responsion followed apparent. Lobeline hydrochloride, 3/40 grain, was administered. Tracing was started o seconds ster edivery. This haby was markedly depressed the respirations consistent delivery graphing efforts. Following appetion, the status completely changed. There is a marked expansion of the close true, deep respirations were established with the opinionary ventilation. Recovery was compute. The unhilled van blood contained 23 volumes type text of oxygen.

been cut clo-e to the child need other sites be considered. We make it a practice always to leave the cord long until respirations are well established.

The following improved technique is the one recommended for general use. Although not difficult it must be correctly understood and performed in order to obtain a speedy and satisfactor, response.

Immediately after delivery the baby is handed to an as Ltant who holds it preferably by the feet with the head down The cord should not be cut unless it interferes with delivery or is very short. As previoudy mentioned it should not be cut close to the umbilicus Thorough a piration with a riewble rubber tube is performed after which a careful appraisal of the baby is made. Particular attention should be paid to the color muscle tonus and the strength and rate of the cardiac impulse. If resuscitation is decided upon the cord is inspected and a good injection site determined. This should be pref erably between 6 and 5 inches from the umbilious. The cord is then doubly clamped about 112 inches distal to the cho-en injection site and cut between the clamp. The remainder of the technique may be carried out on a table or in a heated receptacle, but we prefer to perform it without moving the baby keeping it in its inverted po ition. There is less de lay and less danger of a break in asep-a. In ex ception to this is made in the case of grave a physia. in which a more elaborate technique in conjunction

with a tracheal tube is used. This will be described. later If lobeline is the rest cutating agent to be sed, 1/10 grain of the hydrochloride is injected into the ambilical vein (Fig 3) and the cord compressed firmly between the nert and second nagers adjacent to the clamp The column of blood and drug in the ven is miked toward the umhlas (Fig 6) (Epnephrin and other drugs may be amilially ad-main tered.) The next half of the tripping is done rapidly to avoid delay (The drug has not vet reached the child.) The milking ... then communicate lowly and progress elv until a repuratory response realis. Once breathing is well established, any drug remaining in the vein is removed by tying and cut ting the cord near the umbilious. According to the reference of the operator an inhalator mask max be applied before the strpp ng or after reparations have been induced. Injection into the cord abstance or the umb lical arteries is of no avail. In rare cases injection may be difficult if the vent is small or collapsed. The latter condition is each corrected by having the a. stant compress the cord between the ungers at the umb.Loss and slide them a short di tance toward the clamp This causes the yen to stand out clearly

Identiaco sen of the un' lical vin (1) The imbilical vica is more experiencial and larger than either individual arters (2) The umblical vica nearby always disclose points of dilatation and various in and this in conjunction with its greater size will identify it. Inject at an area of dilatation.

Figure 7 is a blood pressure tracing from the external carotid artery of the cat and is rep-

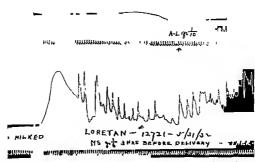


Fig. 3 E. L. No. 12721. weight, 8 pounds, gestation o months, labor, 18 hours, ao munites. Three hours before delivery 1/6 grain morphine sulphate was given. No other medication was used. Delivery was spontaneous. Ether anesthesia was used Baby was white completely limp, and presented a picture of the most severe state of asphyria pallida. Only slow and very weak cardiac pulsations could be detected. The cause of the arbityat was undetermined. One and one half minutes after delivery 1/10 grain lobeline hydrochloride was injected. Twenty one seconds later the cord was rapidly and completely milked. Filteen seconds thereafter a deep and powerful in spiration courred. The tracing shows that following delivery no respiratory efforts were made. The amount injected was relatively large, and the respiratory muscles were thrown into a temporary fination. Relaxation of these muscles followed and then respirations began. That the respirations which are seen to be markedly irregular. The important point is that the haby is breathing which should be contrasted with the apince along the ringetion. Complete recovery followed.

The degree of asphyxia is shown by the following blood andings oxygen content,

og volumes per cent, pH 7 or

resentative of many others. A rather sharp rise followed by a slow fall, sometimes to a little below the base line with a gradual return to normal, has been a relatively constant find ing The blood pressure effects are not significant Chinically there has been no evidence of either cardiac stimulation or depression The question is of little importance because as soon as a few respirations have occurred, the oxygenation of the blood brings about an immediate improvement in the circulation Figure 8 illustrates the effect of lobeline, ad ministered for purposes of demonstration, on a normal, breathing baby Figure o shows an excellent result on a morphinized infant It is apparent at a glance that there is a tremendous expansion of the thorax with a consequent opening of innumerable alveoli. The flow of tidal air and gaseous interchange with the blood are therefore proportionately increased Figure to is a graph taken for teaching purposes. It demonstrates a marked change in rate and amplitude and a corresponding increase in respiratory efficiency of about 310 per cent. Figure 11 illustrates a considerable expansion of the thorax. A change of respiratory style has been brought about. Breathing now takes place with the chest in an inspiratory position. Any atelectasis has been, at least partially, overcome

The graphs have been presented solely to furnish pharmacological evidence. There is no intention to indicate that the treatment was necessary. On the other hand it would be difficult to deny that the babies in question were not better off as a result of the respira-

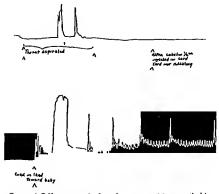


Fig. 4. A F. No 1215 with 1 spunds 15 units getting months, labor schours 7 minutes. The house before delivery 15 grain morphise subhate was more Gas-ors gen etherlanes them was used. Delivery was spontaneous. There was a tight hant in the cord Balby was pale and flaced. There were no pulsations of the cord s slow and faint earther impulse was discerable. The condition was judged to be mixed. One and three-quarter manutes after deliver y/ a grain albedien by inclining the control of the second store the second store and the second store the sec

tory stimulation. Those graphs which illustrate the initiation of respiration (Figs. 12, 13, 14) are in a different category. The last two, particularly, in conjunction with the clinical picture and filood findings, indicate apneas of a serious nature. Although it is impossible to prove it, it is highly prohable that the treatment saved their lives. In our experience the hest results are obtained from centers de pressed by morphine, chloral hydrate, and the harhiturates. In morhund habies only irregular gasps may follow injection, but these are sometimes adequate to save life. In serious hut less profound asphyxias, vigorous and fairly regular respirations are initiated. The

visible effects of the drug disappear in from 2 to 4 minutes

Lobeline acts by lowering the threshold of the center to the carbon dioxide present in the blood. The first inspiration takes place within 15 seconds after milking the cord, if the center is not irreparably damaged. It is imperative that the drug he correctly administered. Before the respiratory response, there is a stiffening of the entire body frequently resulting in a mild opisthotonus. The inspiratory gasp follows almost immediately. These findings are so constant that if they are absent, it is almost conclusive evidence that the drug is not in the general circulation. The increase of

tonus is itself of great value. Certain wnters have opposed the use of drugs because of the danger of overdosage This is not a valid obrection because, if it were, it would be necessary to discard in many diseases, rem edies which are poisonous in excess Overdosage with the hydrochloride does not result in depression, but only in a temporary apnea This is due to a fixation of the chest and diaphragm in the inspiratory position as a result of excessive stimuli from the center (40) This appea is in itself harmless except that the desired pulmonary ventilation does not occur Since delay in pulmonary ventilation is injurious, the apnea for this reason is undesirable. It will not occur if the dosage is correct The most satisfactory results are ob tained with 1/20 grain, although 1/40 grain elicits an excellent response in mild cases. As high as 3/20 grain may be employed although with the larger amounts the aforementioned apnea may be encountered In order to allay apprehension about overdosage, we may state that after careful tests on animals we have used in babies as much as six times the recommended dose without permanent ill effects

In this institution up to January 1, 1937, lobeline hydrochloride has been injected into the circulation of 340 babies. A detailed analysis of these cases will be published in the future. It should be stated that many of the injections were administered to normal babies in order to secure additional data. All treated babies were subsequently observed hy competent pediatricians. In no instance did side effects such as vomiting or convulsions ensue, and no infections of the umbilicus were noted.

Summary Intravenous resuscitation appears to have only a limited field in the poorly breathing baby but is of great importance in the stillborn. Its rôle is almost exclusively that of initiation

Two highly desirable aims, namely an increase of body tonus and a favorable influence on the respiratory center, have heen satisfactionly achieved by lobeline hydrochloride, which has been found to be safe and free from side effects. Its use in combination with other drugs is, at present, under investigation

Important advantages of this method are economy, simplicity, and rapidity of action Disadvantages are the transient nature of the response and the necessity for perfect asepsis

TECHNIQUE

The most important methods of resuscitation have been presented. It is apparent that no one of them is entirely satisfactory. We have found that in combination, however, most encouraging results may be obtained, and suggest the intravenous use of a respiratory stimulant in conjunction with tracheal insufflation and the subsequent application of an inhalator. The technique, important particularly in asphyxia pallida, is as follows.

Immediately after delivery as much material as possible is aspirated with a rubber catheter umbilical vein is then injected and stripped to just short of the half way mark (Figs 5 and 6) second clamp is, however, applied here to prevent the blood from returning toward the site of injec tion So far the initiating substance has not entered the circulation, but has been made ready for subse quent use The next step consists of introducing a laryngoscope, the baby lying on a table with the head over the edge in hyperextension Suction of the larynx and trachea is performed, using a bollow sound designed for this purpose, and the tracheal tube then inserted The latter insuffiates a mixture of carbon dioxide and oxygen in the proportion of 20 per cent to 80 per cent, respectively, under intermittent pressure (5 to 12 millimeters of mercury) If preferred, lesser percentages of carbon dioxide or pure oxygen may be used. The initiating drug is slowly milked into the circulation by further strip ping of the cord, a sufficient amount being introduced to bring about a definite gasp and subsequent respirations The carbon dioxide entering the newly opened alveoli results in an increase in depth and frequency of the respirations The oxygen quickly improves the circulation and also renders the respiratory center more sensitive. When high percentages of carbon dioxide are used, the tube should be withdrawn in from 1 to 2 minutes after breathing has commenced (Cases 9 and 10, Table 1), the tongue pulled forward by a clamp or suture, and an in balator placed over the face. If the lower percentages or pure oxygen are favored, the tube may be left in place much longer The inhalator supplies percentages of about 7 and 93, respectively treatment is continued until the child is out of im mediate danger. In severe cases it is advisable to administer these gases at intervals for approximately

In 2 cases which came under the care of one of us (R A W) the babies showed no signs of life Epinephini was injected directly into the heart As a result, some faint cardiac pulsa-

TABLE II—RESPIRATORY DEPRESSION OCCUP-RING IN 17,860 LIVE BIRTHS, INCLUDING 1,051 PREMATURES¹

	Cates	rer Ce
Viild asphyxia Vioderate asphyxia pevere asphyxia (including asphyxia pallida)	215 63	
Total number which did not breathe promptly at I will intravenous therapy (lobeline—slone or in combination) for the initiation of re initiation of reformation—	341	2 13
Mild a physia	43	
Moderate asphyxia	68	
Severe asphyxia (including asy hyxia pall da)	68	
Total Failure to respond after injection or response followed by death within 2 weeks—	234	
Asphyxia and congenital malformation		
Asphyxia and hemorri ame disease		
Asphy ma and cerebral hemorrhage	6	
Asphyma	4	
Asphyxia atelectasis and prematurity	19	
11.	-	

Total
Trematures of less than 38 weeks gestation are omitted. Alias all feddoors The absence of visible or audible cardiac puisations we. the present control representations or access of doubt. The majority of doubtule fears received as interient of up neithern directly visit the heart. On rate occasions a more control received with the control received with the control received to the c

These statistics compiled by Dr Martin Z Gh no

tions were observed, the preceding technique initiated respirations, and both babies recovered A number of cases have been reported in which life was saved by the intra cardiac injection of epinephrin. If death is not absolutely certain epinephrin should all ways be tried.

This combined technique embodies ad vantages of important methods with few of their disadvantages The tracheal tube over comes obstruction and, if gases are employed, brings them into the lungs under a safe pressure, ready to be absorbed at the first opening of alveoli. No attempt is made to dilate the alveoli forcibly within The use of an inhalator when respirations have been established, is an accepted procedure. It is not imperative to employ varying percentages of carbon dioxide although some writers have claimed benefits from the brief use of a high concentration This has been challenged (o) A 5 to 7 per cent strength is effective and when used, does not require the early removal of the tracheal tube. The technique is effective in any case sufficiently serious to have a diminished or absent laryngeal reflex

The importance of thorough suction cannot be overestimated. The initial inspiration may otherwise result in inundating the bronchial tree with liquor amnii, blood, meconium, etc., and the baby drown or die of shock.

SUMMARY OF STUDY

From January 1, 1927 to January 1, 1937 during which time the greater part of this study was conducted, 17,660 live babies, from 7 to 9 months of gestation, were born in the Methodist Episcopal Hospital (Table II Among them were many instances of rispiratory depression and asphyaia ranging from muld morphanization to asphyaia pallida

The 10 cases in Table I are examples of the latter class. In none were drugs administered to the mother less than 3, hours before de livery. In Case 4, no anesthetic was used. In the others gas ovegen with and without the addition of ether was employed. It is our custom to use a minimum amount of ether, therefore the anesthetic played a minor part as an etiological factor. Unless otherwise specified the "Simple Measures of Resus citation" included suction, holding the bab head downard with the head extended, guille flagellation, and sometimes pressure on the chest.

Delay in the employment of more modern methods in a few of the cases is explained by the reluctance of some obstetricians to utilize unfamiliar procedures when past experience has led them to believe older ones adequate In Case 10 the armamentarium was not im mediately available

It is difficult, of course, to describe satis factorily the relative seventy of each case Pallor, shock, and degree of tonus vary and can best be appreciated by those present With the exception of Case 6 the cardiac pulsation is described. This is a useful index of the extent and duration of oxygen depriva tion The most accurate index of the gravit) of a particular case is supplied by a blood analysis which was taken in all but Case 2 Other factors such as trauma, cerebral edema and hemorrhage cannot be estimated at the time of delivery The oxygen content is nor mally about 12 volumes per cent, and it is remarkable that infants in Cases 3, 7, and 10 recovered It is reasonable to assume that the low content persisted for only a short time, insufficient to damage permanently the deli cate nerve cells of the center On the other hand in Cases 7 and 10 the content must have sunk lower, for considerable time elapsed be

tween taking the blood and the first inspiration. Considering 7.40 to be a normal hydrogen-ion concentration, some of the readings fell to very low levels hardly compatible with recovery.

The blood was obtained under oil immediately after delivery before any resuscitative action was taken. The cord was doubly clamped and cut about 8 inches from the baby. and the blood was then removed from the placental section of the umbilical vein Cases 7 and 10 the cord was clamped and cut before delivery Oxygen content was determined according to the method of Van Slyke and Neill The serum hydrogen-ion concentration was measured electrometrically many cases including several in Table I, the total carbon dioxide content of the blood was determined as well as an estimation of the carbon dioxide tension. These figures are not given as we believe the oxygen content the factor of prime importance We wish to avoid any discussion of the relative merits of pure oxygen and earbon dioxide-oxygen mixtures in primary resuscitation. A moving picture film was made of Cases 1 and 5 and this film, which includes the resuscitation of other cases. is available for those who are interested

The question has been raised whether or not intravenous resuscitation should be practiced alone, if gas therapy or at least a tracheal tube are not available. This is optional when the prognosis appears favorable, even though the depression is deep and the respirations for the time being inadequate. Inasmuch as the graphs show that respiratory efficiency can be increased, and the thoracic cavity expanded by this method, it would seem that there is something to be gained and nothing to be lost by its use The answer is decidedly in the affirmative if a prolonged apnea which has not responded to simple measures must be treated This procedure will often initiate respiratory movements which, even if irregular, and comparatively few in number, result in air entering the alveolt Although this fulfills only part of our recommendation, it is superior to crude. older methods

Unless each stage of a technique has been previously experienced, success will not necessarily attend the first use of modern methods in an urgent case. Adeptness at identifying, injecting, and stripping the umbilical vein is gained by injecting saline into normal infants. It has been observed that a primary failure will often severely prejudice one against later attempts, even when the technique was faulty.

We sincerely feel that a consideration of this study by those with open minds will result in the saving of many lives which would otherwise be lost

CONCLUSIONS

The treatment of asphysia neonatorum has not kept pace with other advances in obstetnes. Methods sometimes dangcrous and of doubtful efficacy are widely employed. A thorough understanding or drugs, anesthetics and resuscitation should be part of the knowledge of the obstetnician.

2 Less than 5 volumes per cent of oxygen in umbilical vein blood is accompanied by clinical evidence of asphyxia. It is shown that a brief fall below i volume per eent is not necessarily fatal, but longer exposures cause permanent damage to the deheate nerve cells of the center and resuscitation is no longer possible.

3 New evidence is brought to light indicating that the atelectatic lung cannot be opened by gases under pressure in the trachea Pressures as high as 18 millimeters of mercury fail to open alveoh and result in damage to the lung tissue Lower, and therefore safer, pressures are even less efficacious

4 Respiratory depressant drugs and anesthetics are discussed and listed in the order of their safety. Morphine alone or in combination, in the opinion of many, has other purposes during labor besides the relief of pain Because of this, it need not be abandoned, as has been suggested by some writers, but should be expertly administered not less than 2 hours before delivery.

5 Methods of resuscitation both old and new are analyzed, and it is shown that no one method is entirely satisfactory

6 A new method for obtaining graphs of the apnea and early respirations of the newborn is briefly described. The method furnishes conclusive evidence of respiratory status at birth, the effects of drugs and anesthetics administered to the mother before delivery, upon the baby, and shows the efficacy of various methods of resuscitation

The results of animal and clinical studies of analeptics and respiratory stimulants are reported Lobeline hydrochloride has given satisfactory results, particularly in regard to

safetv

It is shown that in cases of asphyvia pallida, the injection of a respiratory stimu lant is logical and to a large extent the only possible way of producing a respiratory gasp

o An improved technique for the administration of respiratory and cardiac stimu lants, saline, etc., by means of the umbilical vein is described

10 We suggest and describe a technique which combines 3 methods for the treatment of serious cases. By this means important requisites are fulfilled and excellent results optained

The authors extend their acknowledgment and thanks to Dr O P Humpstone director of the department of ob tetrics and gynecology the Methodist Episcopal Hos pital for the privilege of undertaking this study to Dr Ralph M Beach for numerous suggestions, and to Miss Mabel R Duryea R N for her invaluable co-operation

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PERITONEOSCOPY

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ERITONEOSCOPY is the procedure of visualizing the peritoneal cavity and its contents by means of an optical instrument. The first demonstration and application of this procedure was successfully carried out over 35 years ago and yet, strange to say, the method is but little used. In part, the reason for this reluctance to apply it is seen in the traditional wholesome conservations with which every new scientific thought contends, and yet the endoscopic method of examining body cavities has hardly met with a clinical russbap which could serve as a hindrance to its acceptance.

Any procedure that allows one to sec, through a mere puncture, the diseased organs clearly and sharply in the pentoneal cavity, without a laparotomy and without discomfort to the patient, is ideal. It is especially ideal when a biopsy from tumors or tissues may be obtained, after recognition of the pathology The procedure of peritoneoscopy offers such an alternative This method, however, will not and cannot replace a laparotomy, but it is the procedure of choice in a great many abdominal conditions An acute abdominal case should not be considered, or selected for peritoneoscopy Chronic cases only should be used, and basty surgery should be censured when there is plenty of time to make a diagnosis on chronic abdominal conditions

The internist must share the responsibility for fruitless laparotomies performed for diagnostic purposes, and should use all the ancilary procedures at his disposal before he recommends a diagnostic laparotomy, in order to make or corroborate an intra-abdominal diagnosis. Unfortunately, many of the diagnostic methods that are in use today for making mira-abdominal diagnoses allow only vague and presumptive conclusions. It is true that, by means of x-ray, a diagnosis may be made of intragastric lesions or lesions that

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Medical Association, May 3, 1937, Del Monte, California

affect the continuity and contour of the gastrointestinal tract

The roentgenologist can say whether a tumor is extragastric or intragastric, and in many cases, he can indicate the probability whether the lesion is malignant or not

The gynecologist is able to palpate tumor masses in the pelvis, and, by correlation with chinical history and symptoms, he makes a presumptive diagnosis of the pathology encountered

In cases of ascites, the internist, by correlation of the findings, and the examination of the fluid, will make a presumptive diagnosis of cirrhosis, malignancy, or tuberculosis, etc. Tumor masses are often encountered in the abdominal cavity, and the question arises as to whether these are cysts, abnormal lobes of the liver, retroperatoneal tumors, or malignancies A diagnostic laparotomy, often referred to as a mere trifle, may be from the patient's point of view, a very formidable affair It usually involves a general anestbetic followed, probably, by some flatulent discomfort, some anesthetic vomiting, 2 or 3 weeks' rest in bed, and occasionally complications with the wound The expense may be considerable In cases of carcinoma of the stomach or malignancy of the pancreas, death may follow so soon after as to raise a suspicion that the operation had something to do with the termination of the case

Exploratory laparotomy Economic features— large

- Major operation
 Ho pitalization—
 weeks
- c Dressings-many General anesthetic Diet limitations
- 4 Discomfort variable
- 5 Large incision 6 Mortality risk—6 per cent (Lahe)

- Peritoneoscopy

 1 Economic features
 - small
 a Minor operation
 b Hospitalization—
 - r day
 c Dressings—few
- 2 Local anesthetic 3 No diet restrictions
- 4 Practically no discom
 - 1/2 inch incision Mortality risk-0 2 per cent

Diagnostic laparotomy is often harmful by the accentuation of a neurosis and the ex-

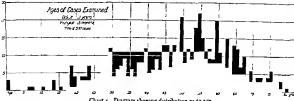


Diagram showing distribution as to age.

103

118

16

500

21.

25,

220

100

30

61

221

acerhation of symptoms, because of an undiscovered lesion or an inoperable lesion diagnostic laparotomy becomes fruitless in those cases in which intra abdominal malignancy of an inoperable nature is suspected and a laparotomy is done in the hope that the presumption is not correct Pentoncoscopy is a far less formidable alternative

The procedure of pentoneoscopy has been carned out for diagnostic purposes, on over 500 cases (Table I) the majority of the pa tients have been referred from the general diagnostic service of a large general hospital and others from private physicians. These patients have ranged in age from 18 months to 81 years, and have been both males and females (Chart 1) Many of the cases have been complicated with ascites so that a diagnosis has not been possible medically tients have been followed to the operating table whenever possible and at postmortem while many patients are still living

TABLE L-ANALYSIS OF 500 CASES EXAMINED Cases

Purpose of examination	
Differential diagnosis	
Corroborating diagnosis	
Determination of metastases	
Differentiation and localization of tumors.	
Total	
Types of cases	
Males	

Biopsy specimens from organs and tumors

With paundice Follow up Autopsies obtained Subsequent operations

Females

With ascites

ANALYSIS OF 500 CASES EXAMINED

This senes of 500 cases includes all cases examined or attempted in succession, over a period of 4 years, and cases are not selected A successful method of obtaining biopsics was not accomplished until after 300 of these cases had been examined. Biopsies are taken only in selected cases. Chronic pelvic inflammators diseases, ectopic pregnancies, or negative abdomens do not require bionsies. The deter mination that a tumor mass is an accessor lobe of the liver, a spleen, or a mass of rolled up oroentum does not require a biopsi Biopsies are taken when the abdominal pathology encountered is not obvious

Biop-3 material has been obtained from growths in the pentoneal cavity, when in dicated for diagnosis Biopsies have been taken repeatedly from the liver fluid obtained is given a careful examination This is done by centrifuging, embedding the sediment in paraffin, sectioning and then ex amining and classifying the cytology present Many cases of malignancy have been proven hy this method. In addition, a bacteriological examination is made in every case

The following pathological conditions have been noted, and diagnosed general carconomatosis of the pentoneal cavity, car anomatous nodules in the liver (Fig 1), carcinoma of the gall bladder, melanotic sarcoma of liver with metastases to the perstoneum, hemangsoma of the liver, hydrops of the gall bladder, lymphoma of the stomach, carcanoma of the stomach, abroad tumor of the uterus (Fig 2), normal pregnancy, ectopic pregnancy (ruptured) ovarian cycl

(Fig 3), ruptured chocolate cyst of the ovary, papillary cystadenoma of the ovary with metastases (Fig 4), hydrosalpinx, retroperitoneal my osarcoma, retroperitoneal sarcoma, hpomyxosarcoma, cirrhosis of the hver, passive congestion of the liver, hepar lohatum, pancreatic cyst, carcinoma of the colon, intra-abdominal hemorrhage, intra-ahdominal adhesions (Fig 5), tuberculous pentonitis, calcified lymph glands, retrocecal appendix,

polycystic kidney Patients with ascites offer the hest type of case for this procedure hecause the abdominal wall, which has been stretched by the fluid, when withdrawn, allows the easy introduction of air It is surprising how little discomfort is noted following the introduction of air into the pentoneal cavity, even in those cases in which there has been no previous distention Ordinary atmospheric air is used instead of oxygen, nitrogen, or carbon dioxide amount of air introduced is not important as long as the patient is flat or in the Trendelenhurg position In my series there have been no complaints of the usual shoulder pains often described following a tubal insufflation The air is always removed following the procedure, although some residual air, localized between the liver and diaphragm, often remains This has been noted occasionally in cases examined with x-ray shortly following the procedure

THE VALUE OF THIS METHOD

The value of pentoneoscopy hes in its ease of application and the differential diagnostic possibilities obtained through this direct, eye controlled method of examination. It is possible to diagnose a questionable case correctly and without delay. It is possible to decide early the advisability of operation in patients showing grave pathology. It is possible to differentiate tumor masses from various organs in the peritoneal cavity. It is a simple method for determining the operability of mahignant gastric lesions.

Because of its ease of application, it is the method of choice, in preference to a diagnostic laparotomy for the differential diagnosis in cases of undetermined ascites, tuberculous peritoritis, the source of tumors, the operabil-

ity of intra-ahdominal lesions, and the question of intra-abdominal metastases

The indication for its use in gynecological cases needs no comment when the profession realizes the extent to which this ideal method of examination of the pelvic organs can be carried out. We are able to see the organs clearly in their natural living colors

Peritoneoscopy does not, and will not, replace laparotomy, but it is the procedure to he selected when confronted with the above

diagnostic problems

I find several instances in my series where the clinical diagnosis appeared self-evident, but which was altered by peritoneoscopic examination. This has been true principally in cases in which the diagnosis has been changed from cirrhosis to malignancy or from malignancy to cirrhosis.

It is my opinion that all patients with clinical cirrhosis of the liver, or suspected cirrhosis, should have the benefit of a peritoneoscopy, in order definitely to classify the condition

HISTORY OF THE SUBJECT

In 1901, Kelling (11, 12) first demonstrated this procedure on a living dog by inflating the abdominal cavity with air and examining the contents with a Nitze cystoscope Kelling later published two monographs in the German literature, the first appearing in 1902 and the second, dealing with human subjects, in 1910 In 1910, Jacobaeus (3-9) of Stockholm published a paper on a like procedure of visceral exploration, developed independently by him

In 1923, after 13 years of silence, Kelling (13) addressed the German surgical society concerning this subject. He related how the bad economic situation of the population after the war had compelled him to make wider use of this diagnostic method among his patients, since it saved them the prolonged and costly stay in the hospital which an exploratory laparotomy entails. The work of Kelling hecomes remarkable in that the technique applied and described by him 35 years ago is, with httle modification, the technique used today. He made use of pneumoperitoneum long before it was practiced in the field of

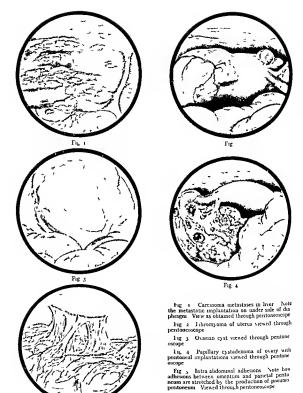


Fig 5

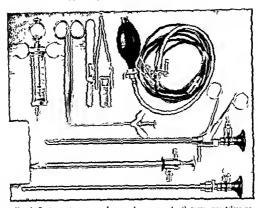


Fig. 6. Instruments necessary for procedure arranged with accessories telescope, sheath with bistoury tipped obturator, biopsy forceps with telescope, pneumopen toneum needle, sphygmomanometer bulb and tubing, electric cord connection, scalpel, scaisors, thumb forceps syringe, sponges, and sam clamps

roentgen diagnosis, but he failed to make carly clinical application of his method and let Jacob seus of Stockholm, almost 10 years later, receive recognition for the procedure Kelling maintained that the mobility of the intestines in the living subject is such that they will not sustain injury, but will recede or slip aside before the centle and slow thrust of the trocar This same fact was brought out by Jacobaeus in his monographs on the procedure Tacobaeus later devoted his major interests to the perfection of thoracoscopy and developed the technique of galvanocautery for separation of adhesion bands in the chest preliminary to collapse of the lung as used today throughout the world

In 1911, Bernheim, an American, working at Johns Hopkins Medical School introduced a proctoscope of 1/2 inch bore through an incision in the epigastrium and with the aid of a head mirror examined the stomach, liver, gall bladder, and diaphragm

In 1912, Nordentoett, of Copenhagen, devised an instrument which he termed a "trocarendoscope" and patented under that name He described the first views of the interior of the female pelvis as seen when the patient was in Trendelenburg's position, after the abdomen had been distended with air

In 1912, Tedesko, of Vienna, reported his experiences with laparoscopy, following the technique described by Jacobaeus

In 1912 and 1919, Stolkind, in Russia, reported the use of this procedure

In 1913, Meirelles, in South America, published a discussion on laparoscopy

In 1913 and 1915, Renon and Rosenthal, of Pans, considered this method excellent for making visible to the observer certain affections of the liver and peritoneum

In 1914 and 1920, Roccavilla, of Italy, modified the method by designing an instrument which permitted the source of light to remain outside the abdomen

In 1020, Orndoff, of Chicago, stated that he experimented with this method many years and was still practicing it. He particularly praised it in diagnoses of hemoperitoneum, tuberculous peritonitis, and extra-uterine pregnancy.

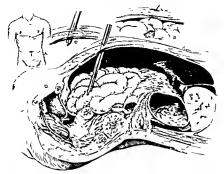


Fig. , Technique of pentoneoscopy. A Usual site of puncture B insertion of pneumoperitoneum needle C insertion of trocar. D visualization of pentoneal contents with peritoneocope

In 1924, papers appeared from Edwards, of London Steiner of Manta Georgia Stone of Kansas Zollikofer of Switzerland and Unverright of Germany

In 1925, Nadeau and Kampmeier, of Chicago published a very complete description of the technique of endoscopy of the abdomen

The procedure has been given various names by the various workers who have pioneered in its development

- Cœboscopy (Kelling 1901)
 Ventroscopy (Van Ott, 1901)
- 3 Laparoscopy (Jacobaeus 1911)
- 4 Organoscopy (Bernheim 1011)
- 5 Peritoneoscopy (Orndoff 1020)
- 6 Abdominoscopy (Medical Dictionary, and Steiner, 1924)
 - 7 Celoscopy (Medical Dictionary)

8 Splanchnoscopy (**Icdicat Drithonar**)
The pentionecscope (Fig 6) developed for the examination of this series consists of five parts (1) sheath (2) bistoury tipped obturator which fits the sheath (3) telescope made to fit the sheath, and a biopsy forceps, (a) fluid evacuator (5) small needle trooar for

pneumoperitoneum and a special Rehfuss tube with an electric light at the tip

The sheath is of metal, lined with bakelite, the top of which is fitted with a lock and with a stopoot on the side. The sheath is arranged to receive snugly and lock in place the bistoury tipped obturator, with dull point. When the obturator is in place the instrument becomes a trocar for making a puncture in the abdominal wall.

The telescope is one which gives the highest degree of light the largest held the smallest magnification and the most direct vision it is necessary that the telescope fit the sheath with an air tight connection. It should belong enough to reach every part of the abdomen through one puncture below the umblicus

The biops) forceps is a special ronger typed forceps for securing specimens through the sheath. It fits the sheath ar tight 's special telescope allows visualization during the procedure of taking the biops. An electrical connection on the forceps allows the use of a coagulating current to control bleeding. The tip of the biopsy forceps becomes the coagulating electrode after specimen is taken

The fluid evacuator is a straight tube closed at one end with multiple small perforations in its distal half. It is also equipped with an air tight lock that allows it to fit in the sheath. The open end is connected with a suction apparatus. The tube can be slipped in and out of the sheath which allows it to be pushed among the coils of bowels without injury.

Rubber tubing is necessary to connect either the fluid evacuator to a suction apparatus for withdrawing the fluid or to connect a bulb similar to that used on a blood pressure apparatus with the stopcock on the side of the

sheath to inject air

The pncumopertoneum needle is a small, dull trocar needle apparatus 5 inches long. At the hilt of the needle there are two flanged handles so that it may be held steady during the inflation of air. The bulb with rubber tubing is arranged to fit this needle.

The stomach tube has an electric light on the tip and a perforation just proximal to the tip. Wires are threaded through the tube for the electrical connection. The electrical connection is similar to that used on the telescope, and is combined with an air connection which allows the stomach to be inflated with air at the time the light connection is made.

The procedure of peritoneoscopy has been done in all cases in the operating room Strict aseptic technique has been used throughout

the procedure

The operating room technique is the same as for a laparotomy. The patient is draped and the abdomen prepared as for an abdominal incision. The peritoneoscopic instruments are sterilized by emersion in 1 1000 microury cyanide solution for 30 minutes. This includes the electric cord for lighting purposes. Alcohol cannot be used as a sterilizing agent for the telescopes because it dissolves the cument around the lenses.

The equipment for an operating room set-up is as follows

- I One 20 cubic centimeter Luer syringe with needles for anesthetization
 2 30 cubic centimeters of 1 per cent no ocain solution
 - 30 cubic centimeters of 1 per cent novocain solution
 One scalpel
 - 4 One dozen small gauze sponges
 - 5 One baumamometer bulb
- 6 One 3 inch or one 12 inch piece of rubber tubing to
 fit bulb and air connection of sheath
- 7 One battery for lighting instruments

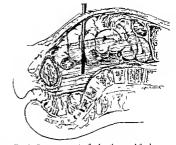


Fig. 8 Removing ascitic fluid with special fluid evacuator with patient in horizontal position

The operating room should be so arranged that it may be made dark during the examination

TECHNIQUE

No preparation is necessary before the examination other than 1/4 grain of morphine about 20 minutes before the puncture is to be made The site of puncture is selected and local anesthesia with novocain is used. It is a good plan to encircle the puncture site with subcutaneous wheals of novocain with a diameter of approximately to centimeters Following this, the needle is inserted to the peritoneum, and novocain is infiltrated just above it A small stab incision is made just large enough to admit the sheath of the instrument snugly, and the point of the knife is carned down until the fascial layers are nicked The pneumoperatoneum needle is inserted into the abdominal cavity gently and moved around in a circle to determine the presence of adhesions or fixed bowel at the point of entry The abdomen is then distended with air and the pneumoperitoneum needle is removed The sheath with the bistoury tipped obturator, which acts as a trocar, is now inserted into the abdominal cavity. When ascitie fluid is present, the insertion is exactly the same as the insertion of a trocar preparatory to an abdominal paracentesis. It is necessary in all cases that the abdominal wall be tense and fixed, either by distention of abdominal cavity with fluid or air, or both The

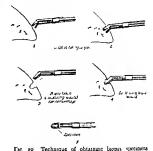


Fig 9 Visualization of appendix (retrocecal) with patient on left side Air displaces cecum so that appendix may be visualized

puncture must be carried out steadily and cautiously with the instrument pointing to either side of the spinal column, so that if the entrance into the cavity is made suddenly the gut will not be injured against the bony column

As soon as the entrance has been accomplished the obturator is removed and the telescope is inserted. If fluid is present suction is applied with special evacuator inserted in the sheath and the abdomen emptied (fig. 8). This is done entirely with closed dramage. After evacuation of the cavity the air bub is connected and the abdomen is distended with air. Ordinary atmospheric air is used. It is not necessary to measure the quantity of air used, as the abdominal cavity is not sensitive to inflation, and the patients do not complain of any other sensation except one of fullness.

As soon as the abdomen is distended, the peritoneal cavity and its contents become visible, and the examination may proceed Upon completion of the examination the air is allowed to escape. One may assist the exacutation of air by pressure with the hand placed flat on the belly. Having evacuated the air, the instrument is removed. In cases of ascites the ascite fluid may drain for a day or two. In cases witbout ascite fluid one slin stitch or skin clamp is used and a simple stitch or skin clamp is used and a simple



through the pentoneoscope

dressing is applied. No disability follows, and the patient is allowed to eat his meals without interruption.

VISUAL EXAMINATION

As the air is of light specific gravity, it re mains uppermost in the abdominal cavity Therefore, through changes of position of the patient, one is able to shift the air and thus displace the intestines at will With the patient in a horizontal position, one has a full view of all organs in their normal relation under the abdominal wall. For an examina tion of the pelvis Trendelenburg's position is used The organs in the left side of the abdo men come into view when the left side is uppermost, and likewise on the right (Fig 9) Therefore, a safe and easily changeable table is needed for the examination Movements of the instruments cause the patient no dis comfort unless pressure is made against the panetal pentoneum, or a loop of bowel is pulled by the tip The light of the instrument shines through the abdominal wall, when the room is darkened, and shows where the tip of the instrument is located With one hand on the abdominal surface, pressure and manipu lation may assist considerably

The whole examination should be done with a fixed plan in mind, otherwise the wonderful

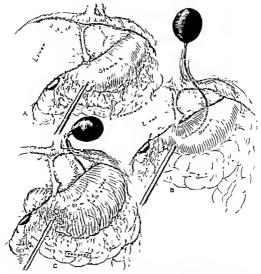


Fig 17 Operability of gastric malignancy A, Visualizing stomach, liver, and adjacent tissues and localizing malignancy, B, unfolding stomach under vision with air, C, transillumnation of inflated stomach

natural pictures would tend to lead astray and thus prevent seeing the important points A general complete examination of the abdominal cavity, with recognition of organs and landmarks should be done before any diseased organs are examined This is necessary in order that the examiner may become oriented and able to recognize the objects be sees Pathological pictures may then be ex-After a few examinations amined minutely the pictures become very clear, natural, and easily understood. The instrument should be long enough so that a single puncture performed in the midline just below the umbilicus brings all the contents of the abdominal cavity into view Puncture, however, may be made at any point in the abdomen

Peritoneoscopy visualizes the surface of organs which are contained in the peritonical cavity, but nothing inside of a viscus or buried deep in the tissues can be seen

The liver, after air insuffiation, falls away from the diaphragm and can be examined in regard to its color, smoothness, nodules and size. The edges can be followed, the upper surface, right and left lobes, and a portion of the under surface seen. The gall bladder can be noted beneath the edge. The thickness of the gall bladder, its color, circulation, and adhesions are easily seen. I have not been able to palpate the gall bladder with tip of the instrument for stones, as noted by Stemer.

The greater curvature of the stomach can be noted and the anterior surface examined

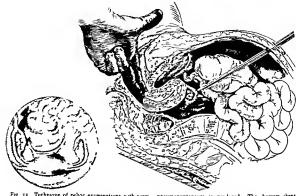


Fig 12 Technique of pelvic examinations with view of pelvic organs obtained through peritoneoscope after

pneumoperatoneum is produced. The diagram shows manipulation of pelvic organs through the vagina.

The lower up and edge of the spleen is seen in the extreme upper left quadrant just beyond the stomach surface. When enlarged the spleen is easily examined. The omentum can be examined completely The surface of small colled intestines gives a remarkable picture. Normally, they appear with a slightly brown ish hue, and peristalite waves can be noted. The surface of the cecum, the ascending transverse and descending colons are easily visualized. The appendix is seen only occasionally.

The dome and posterior surface of the blad der, the fundus of the uterus tubes and ovaries are seen and the pathological state noted. The parietal pelvic peritoneum can be examined completely throughout.

TECHNIQUE OF OBTAINING BIOPSY SPECIMENS

Biopsy specimens may be obtained through the peritoneoscope sheath (Fig 10) Biopsy specimens should not be taken directly from the tissues of a hollow viscus, abscesses, or cysts encountered because of the possibility of injury or perforation. Liver and splein biopsy specimens or suitable pieces of tissue from any solid organ or tumor mass can be obtained for examination. Biopsy specimens are easily obtained from metastases in the liver and omentum or from the peritoneal surfaces.

The tp of the biopsy forceps when closed is so arranged that it forms a cup containing the tissue material. The closed tip acts as an electrode for coagulating the wound resulting from cutting the biopsy specimen. The biopsy material is not affected by the coagulation current. All wounds should be thoroughly coagulated after the specimen is obtained, regardless of whether bleeding is noted or not. This is especially true when the specimens are taken from the liver or spleen.

The abdomen should be completely distended with air and the point selected for taking the material should be isolated from adjacent tissues, so that there is no possibility of coagulating other than the point from which

the tissue is taken. Practically any type of high frequency generator, diathermy machine, coagulating unit or whatever else it may be called, can be used with the biopsy forceps for hemostasis or coagulation. The current may be properly adjusted before use, by trying it on a piece of meat.

A small visualizing telescope is used with the biopsy forceps so that the entire procedure of cutting the specimen and hemostasis is

constantly under vision

RECOGNITION OF PATHOLOGY

The macroscopic appearance of living tissues is quite distinctive and differs considerably from their appearance in the cadaver Peristalsis is noted in intestines and stomach and pulsation is seen in liver and spleen

When an examination is made of the contents of the abdominal cavity all the facts noted are correlated into a final conclusion. A large smooth, red liver would suggest chronic passive congestion or hipatitis, whereas a small liver with a wrinkled surface and hobnailed irregularities would suggest atrophic cirrhosis. Adhesions are noted as to whether they are situated at site of former operations, or are general. They may be spider with, lacelike, or massive bands. Carcinomatosis of the peritonical cavity is seldom, if ever, associated with adhesions.

Absence of peristalsis in a localized area of the stomach suggests an intrinsic lesion in this portion. When the spleen is visible, it is enlarged Dilated veins in the mesentery, stomach, and under surface of the diaphragm are seen in cases of cirrhosis metastases usually are distinctive in that they are various sized nodules, but often miliary implantations are impossible to differentiate from miliary tuberculosis without a biopsy. A deeply jaundiced patient with a thickened, small whitish gall bladder would suggest chronic cholocystitis with stones, whereas a distended normal appearing gall bladder would suggest carcinoma of the head of the pancreas

OPERABILITY OF GASTRIC MALIGNANGA

Larly diagnosis is essential if there is any hope of reducing the mortality of stomach

cancer from its present high rate. By the time the patient presents a classic picture of gastric malignancy, weight loss, emaciation, and vomiting, not much hope is left, though the lesion be technically removable, operative mortality then looms too high In Lahey, Swinton and Peelen's series, the x-ray pictures proved diagnostically accurate in 95 per cent of the cases However, these men concluded that the decision as to the operability of a given stomach cancer is difficult and easily mistaken They concluded that palliative operations were distinctly unfortunate in these cases, but that exploration to settle the question of operability was frequently indicated and that the mortality rate in those exploratory laparotomies was low Lahey, Swinton and Pcelen series, only 25 per cent of the cases were operable In their series, explorations were done on 174 per cent of inoperable cases with a 6 per cent mortality from the exploration

In cases of given stomach cancer, three things are necessary as to the decision of operability, provided that no metastases are demonstrable in the skin, glands, lungs, or

bones These are

Are there mutastases in the liver?

2 Is there extension to adjacent tissue and peritoneum?

3 How much of the stomach is not involved?

These questions can be answered in a very high percentage of cases by means of pertioneoscopy. Visible metastases can be seen and easily identified in the liver. The peritoneal surfaces and omentum can he examined for visible metastatic lesions. The malignancy in the stomach can be seen and adjacent tissues examined for extinsion of the lesion. By means of air and transillumination, the amount of uninvolved stomach wall can be approximately estimated.

Pertoneoscopy should always be done in heu of exploration in order to determine the question of operability of a stomach cancer. In the Lahey, Swinton, and Peekin series in which 174 per cent had explorations and were found to be inoperable, the in ijority of these easies could have been determined by me insoft the simple procedure of peritoneoscopy.

The operative mortality of 6 per cent could have been markedly lessened

The technique (Fig. 11) for the examination of a known case of gastne malignancy is not difficult. The patient is prepared as described for pentoneoscopy The stomach is clean and empty The special stomach tube, fitted with an electric light at its tip, is placed in the stomach through the mouth prior to examination The peritoneoscope is inserted as previously described. The liver is visualized for metastatic lesions, the stomach is exammed in its normal state, noting circulation, color, and pathology visible The stomach is now distended with air under vision and examined while it unfolds. Good stomach wall distends, infiltrated stomach wall is rigid When the stomach has been distended with air, the globe at the tip of the tuhe is lighted and the stomach wall is transilluminated. The stomach appears to the observer like a "Chinese lantern" and any infiltrations in the gastric mucosa can be outlined. It has been my custom to have the surgeon present at this examination in order to determine with the peritoneoscopist the operability of the case In a small percentage of cases of this kind, no metastases are found except in retroperitoneal nodes If such is the case, an exploratory laparotomy must be done, as pentoneoscopy will not visualize these retropentoneal glands

PELVIC EXAMINATIONS

The gynecologist hecomes very adept in determining lesions in the female pelvis hi manually However, he is often at a last to determine the source and type of tumor mass es, the presence or absence of ectopic pregnancies, the congenital absence of organs and to differentiate at times chronic pelvic inflammatory lesions from other pathology

When a patient is placed in the Trendelen burg position and a pneumoperitoneum is produced (Fig. 12), the viscera in the pelvis are displaced and the entire pelvis is exposed to view The uterus, both tubes, both ovaries, and the sigmoid colon and hladder can be visualized The examination is facilitated and assisted by inserting one hand in the vagina and manipulating the pelvic organs uterus may swing from side to side thus ex

posing the tubes, ovaries, and round liga ments Occasionally one may push up into view tumor masses buried deeply in the broad licaments

Ectopic pregnancies, malignancy of the ovaries, engorged reddened tortuous tubes. hydrops of the tubes, absence of organs, mal formations of organs, adhesions, pelvic tuber culosis, malignant metastases, malignancies of the nyaries, cysts, and fibroids can all be seen and recognized

OTHER EXAMINATIONS

The sigmoid colon can be examined with the pertinneoscope in the same manner as a stomach examination is conducted. A tube may be inserted into the rectum on the up of which is an electric light. The colon is dis tended with air and transilluminated

This procedure is also applicable to examin ing the colon for spasm and spasticity

Diverticula may be noted, and in one case a diverticulum of a bladder was seen

Hernias may be visualized from inside the abdominal cavity, and the tip of the telescope

may even be placed in the hernial ring Abdominal examinations may be markedly assisted by manipulation of tumor masses and viscera with one hand of the operator on the abdominal wall

COMPLICATIONS AND ACCIDENTS

Puncture of a viscus is a complication that may happen to anyone attempting penione oscopy This can be avoided, bowever, by (r) careful examination of the patient prior to attempting procedure, (2) selecting the point of puncture to avoid all operative ab dominal scars, (3) always using a bistour,

plunger with a dull tip Kelling (11, 12) maintained in his early writings on this subject that the mobility of the intestines in the living subject is such that they will not sustain injury but will recede or slip aside hefore the gentle and slow thrust of the trocar This same fact has been brought aut by Jacobaeus (3-9), Ruddock, and other writers an this subject. It is my opinion that any viscus, unless so adherent that all freedom of movement is gone, will slip aside hefore the thrust of the trocar in the living subject The

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TABLE II -ACCIDENTS AND COMPLICATIONS

TABLE	11 -	JULIDENT	5 AN	B COMPLE	WITO	33
Accidents					Cases	Per tent
	hon al	nunctured	with	hypodermic		

Small bowel punctured with bypodermic needle, no sequelæ Small howel punctured with pneumoperi

2 Small bowel punctured with pneumoperi toneum needle Operation—hole repaired Uneventful recovery Cause—postoperative adhesions

3 Small bowel punctured with trocar Opera tion—bole repaired Uneventful recovery Cause—postoperative adhesions

4 Small bowel punctured with trocar Operation—hole repaired Uneventful recovery Cause—tuberculous pentonitis 5 Transverse colon punctured with trocar Operation—hole repaired Uneventful re-

covery Cause—carcunomatosis

Sigmoid colon punctured with trocar Operation—bole repaired Uneventful recovery Cause—intestinal obstruction (car

cinoma of rectum)
7 Stomach punctured with pneumoperato
neum needle Operation—hole repaired
Uneventful recovery Cause—full meal

8 Stomach punctured with trocar Operation—hole repaired Uneventful recovery Cause—dilated stomach (Hod,kin's disease)

Total accidents

Deaths

Examination determined extensive metas tatic carcinoma of liver. Biopsy specimen taken from nodule. Patient died o hours later of hemotrhage from biopsy wound in fiver.

Summary Total cases examined

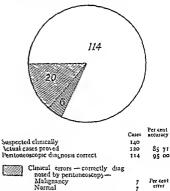
Total complications and deaths Unsuccessful examinations

Cause of failure to enter abdominal cavity in all 3 due to dense adhesions

intestine may be punctured by this method, should it be firmly fixed to the parietal peritoneum by adbesions. Puncture of the bowel has occurred in my series of 500 cases 8 times (Table II). Each time the instrument has been left in place and an abdominal incision has been made. In each instance, the trocar could have been removed without soiling the peritoneal cavity, as the bowel was firmly plastered against the parietal peritoneum.

The death recorded, resulting from a fatal bemortbage following a biopsy from a carcarcinoma metastatic nodule in the liver, occurred because of insufficient coagulation of the biopsy wound. Many biopsies have been taken since, but thorough coagulation of the wound is done, in all cases, whether bleeding is noted for not.

TABLE III -SUSPLCTED CIRRIOSIS-140 CASES

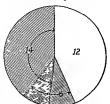


Total peritoneoscopic errors

Due to extensive peritoneal malgnancies and extensive adhesions from tuberculosis, cases will be encountered in which it is impossible to enter the abdominal cavity with a peritoneoscope. This has occurred three times in my series, once with malgnancy and twice with tuberculosis. The peritoneoscope merely enters a small pocket walled off by adhesions, or it is impossible to produce a pneumoperitoneum in order to go ahead with the procedure. When such an abdomen is encountered, no attempt is made to insurt the peritoneoscope. However, the finding of such a condition may accomplish the purpose for which the examination was intended.

Hernia through the scar of the puncture wound has not occurred in my series of cases Hematoma at the site of the puncture wound has occurred on two occasions

TABLE IV —SUSPECTED TUBERCULOUS PERITONITIS—32 CASES



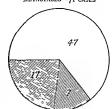
	Cases	Per cent	
Suspected clinically	32		
Actual cases proved	18	36 2 3	
Pentoneoscopic diagnosis correct	15	66 6,	
Clinical errors—correctly diag nosed by peritoneoccopy— Curhoss of the liver Carcinoma of the peritoneum Pelvic inflammatory divease Felvic malignancy Trostoperative adhesions Usasupected Total clinical errors	4 4 3 1 1 1	Per cent error	
Peritoneoscopic errors— Carcinoma of the peritoneum Pelvic malignancy Normal abdomen Unsuccessful Vecudent Total peritoneoscopic errors	1 2 1 1 1 6	33 33	
Both in error	3		

ACCOMPLISHMENT OF PURPOSE OF EXAMINATION

The procedure of pentoneoscopy should not be done without a definite purpose for which the examination is made. The procedure is then carried out in order to accomplish this purpose. To determine the presence of metastases to corroborate a diagnosis, and to aid in differential diagnoses, are purposes of examination which justify the procedure.

If the purpose of examination is accomplished, then the examination is successful and justified. The procedure should not be expected to accomplish more than the purpose for which it is done.

TABLE V —SUSPECTED PERITONEAL METASTASES—71 CASES

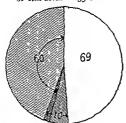


Cases	Per cent accuracy
71	
	ÓΙ
47	8, 03
3 4 2	Per cent error
2	
i	
17	23 9
3 1 1 1	12 07
	71 54 4/ 3 4 2 2 2 2 1 3 17

PERITONEOSCOPIC STATISTICAL STUDY OF

The compilation of statistics with regard to comparing accurately clinical methods of diagnoses and peritonocsopic methods be comes exteedingly difficult. This is especially true when a case is referred for peritonocsopic with four or five suspected clinical diagnoses. One may be correct, the others may be wrong, or all may be wrong and the peritonocsopic diagnosis may be right or wrong. The accompanying tables reveal the percentage of clinical accuracy compared to the percentage of peritonocoscopic accuracy, and list the errors in diagnosis for both methods. Selected for statistical study are suspected cases of tuber-

TABLE VI —SUSPECTED MALIGNANCY OF THE LIVER—135 CASES



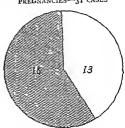
	Cases	Per tent accuracy
Suspected clinically	135	
Actual cases proved	79	55 6 87 4
Pentoneoscopic diagnosis correct	69	87 4
Clinical errors—correctly diag- nosed by pentoneoscopy—		
Carrhosis	34	Per cent
Hepatitis		ettor
Passive congestion	3	
Normal	9	
Chronic cholecy status	2	
Postoperative adhesions	2	
Unsuspected	4	
Ovarian cyst	1	
Carcinoma of the ovary	1	
Abscess	1	
Hepar lobatum	60	
Total clinical errors	60	44 4
Pentoneoscopic errors-		
Curhosis	6	
Vormal	2	
Abscess	1	
Passive congestion	_1	
Total peritoneoscopic errors	10	12 6
Both in error	2	

culous peritonitis, peritonical metastases, cirrhosis, malignancies of the liver (both primary and secondary), and ectopic pregnancies This makes a total of 400 cases

This is the number of cases conforming to the above diagnoses which have occurred in the series of 500 cases reported. The remaining 111 cases are made up of various diagnoses, a series of each of which is too small for making a statistical study.

The average clinical accuracy in the total series is 63 9 per cent, whereas the average

TABLE VII —SUSPECTED ECTOPIC PREGNANCIES—31 CASES



	Cases	Per cent accuracy
Suspected clinically	31	
Actual cases proved	13	42
Pentoneoscopic diagnosis correct	13	100
Clinical errors—correctly diag nosed by pentoneoscopy— Intra uterine pregnancies Intra uterine pregnancies with	10	I et cent
pelvic inflammatory discase	4	
Pelvic inflammatory disease	3 18	
Ruptured ovarian c) st	_1	
Total chinical errors	18	58
Fotal pentoneoscopic errors	0	٠,

pentoneoscopic accuracy is 91 7 per cent The comparison for the individual case diagnosis is shown in the Tables III to VII

Twenty-two cases of this series of ectopic pregnancies have been reported by Dr Robert B Hope in the February, 1937, issue of Sukcery, Gynecology and Obstrences Dr Hope has acted as my assistant during the past 3 years in the clinical examination of patients by peritoneoscopic methods

SUMMARY

Person essential description of a description of a description of the second of the se

Peritoneoscopy is a minor procedure under local anesthesia, with practically no discomfort and small economic features, in contrast to a diagnostic laparotomy which is a major procedure requiring a general anesthetic, and entailing considerable economic features and variable discomfort

The procedure cannot take the place of surgery, but, hy making a definite and correct diagnosis, it may prove a valuable aid, if the case is an operable one and surgery is deemed necessary

The value of this procedure becomes evident when we note that examinations may be made completely and accurately, hippsy specimens of tumor masses and tissues may be quickly. safely, and painlessly taken for diagnostic purposes, and exploration of poor surgical risks may be accomplished

All patients with a diagnosis of cirrhosis, or suspected carrbosis, of the liver, should be examined with the peritoneoscope for cor roboration A questionable diagnosis can often be excluded or confirmed, and a decision reached as to form, kind, and extent of the pathological process

A definite purpose of examination is necessary to justify a peritoneoscopic ex amination. The procedure should not be expected to accomplish more than the purpose for which it is done

The very practical results of this relatively simple method of examining the contents of the ahdominal cavity with the eye should command for it, as a diagnostic procedure, the general use which the cystoscope now holds for the examination of the hladder and 11 Merkelles E A. Laparoscopia Tribuna med., Rio

The peritoneoscopic accuracy, as noted in a statistical study of 400 case studies, is or 7 per cent as compared to the clinical accuracy of 63 o per cent

The procedure of pentoneoscopy is a technical one and requires that the operator train himself in the details of the procedure and in the use of the instruments. He should he able to recognize and differentiate the macroscopic appearance of pathological processes when seen

Appreciation is expressed to Drs. Robert B Hope of Los Angeles California and Andrew B Bonthius of Pasadena California for the assistance which they rendered in mak J24. OFF I DOTE! (EDLER VON OFF) Illumination of the ing the clinical exmination of the patients included in this senes

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HEMORRHAGIC OR TRAUMATIC CYSTS OF MANDIBLE

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HE great majority of cysts of the jaw bones originate in abnormal develop ment of cells derived from the enamel organ of the tooth, and bave a cap sule lined with epithelium However, one is occasionally surprised to find a case, especially in the mandible, in which a cavity exists in the bone, containing fluid, but in which no lining membrane apparently is present. It is well known that non epithelial cysts occur in the long bones of the extremities in connection with osteitis fibrosa, and also following trauma, which latter have been explained on the basis of bematoma formation. According to Blum, to whom we are greatly indebted for information in preparing this paper. Boet ticher and Beneke were the first to conceive of a traumatic bematocyst developing in a previously healthy bone. Their findings were confirmed by you Haberer and Pommer, who described the mechanism and the pathology Briefly, the process is one of intramedullary hemorrhage from trauma insufficient to cause fracture, in a young bone To quote Thoma "The intra osseous blood clot causes pressure on the vessels, producing stasis The decom posing fibrin, in turn, causes an irritation, which results in resorption of the bony trabeculæ of the spongrosa This produces a large cavity in the central part of the bone cyst increases in size by displacement of the spongiosa" Hemorrhagic cysts, comparable to cysts found in the long bones as a result of trauma, bave been reported in the mandible All cases described have been in adolescents. most of them have been apparently due to intramedullary bemorrbage following trauma insufficient to cause fracture or escape of blood into the surrounding soft tissues Probably the first mention of such a condition was made by Lucas in 1929, he described vray and

From the Department of Maxillofactal Surgery Graduate School of Medicine University of Lennsylvania and the Presby terian Hospital Read before the Philadelphia Academy of Surgery April 5 1937 operative fuidings which are in conformity with the reports of later writers. Other cases have been mentioned by Schneder, Thoma, and Blum Blum was the first in this country to describe the pathology of these lessons, showing their correspondence in every respect with the hemorrhagic cysts of the long hones.

The cavity in the bone is apparently uncon nected with the teeth, although the roots of the latter may be secondarily involved. It is filled with decomposed blood and later with clear serous fluid, and at operation climical examination shows no lining membrane, the walls of the cavity being apparently bare. In Blum's cases, however, instological examination of the bony wall showed that a thin lining was present, consisting of blood vessels embedded in a loose framework of connective its sue fibers and a compressed layer of dissolved red corpuseles. Osteoblastic and osteodistic changes in the bony walls were also seen

The diagnosis may be dishcult. It depends on a history of trauma-sometimes quite vague, in a young patient, insufficient to cause fracture, with later development of dull pain, and sometimes a swelling of the body of the mandible, x ray findings of a well defined, somewhat irregular cavity in the bone along the course of the inferior dental canal, with no apparent connection with the roots of the teeth, the pulps of the latter being vital Differentiation from dental root cysts and dentigerous cysts may be practically impos sible before operation, unless the x ray shows definite connection of the roots of a pulpless tooth or of the crown of an unerupted tooth with cyst cavity At operation the absence of a definite epithelial membrane charac teristic of the cysts of dental origin is at once evident

Benign giant cell tumor offers another difficulty, but usually shows x ray evidence of bony trabeculæ running through the tumor



Fig r left Case r Roentgenogram before operation, showing clearly defined cavity in mandible not involving the roots of the teeth Fig 2 Case 1 Rountgenogram made 3 years after operation showing oblitera tion of cast casity by new bone



Fig 3 left Case 2 Roentgenogram before operation 11g 4 Case 2 Koentgenogram made about a year after operation showing bone regeneration

mass The rapid development after trauma often leads to fear of sarcoma If necessary, the cystic character of the swelling can be demonstrated before operation by aspiration

Treatment consists in opening into the bone cavity after exposure through a flap of gum or through skin incision, and evacuating the fluid contents. The cavity is preferably kept open and allowed to heal by granulation

Blum states that these cysts would probably respond favorably to aspiration of their fluid contents, but rightly favors wide opening and evacuation, as in this way only the presence or absence of an epithelial membrane can be determined Also, if cyst wall bulges, aspiration alone might not cause collapse and restore the normal contour of the bone

To the cases previously reported by Lucas (1 casc), Schneider (3 cases), Blum (3 cases) and Thoma (2 cases), we wish to add 4 of our own It is to be noted that 3 of our cases were in sons of physicians, though of course this is merely a coincidence

CASE 1 HS, aged to years, male, was referred by Dr L P Pendergrass in February, 1931, on account of a swelling of the left side of the mandible This had been noticed for about 6 months and seemed to be slowly increasing in size but gave only slight discomfort. There was a vague history of a blow received on the jaw 2 years before There was no history of trouble with the teeth on that side of the lower jaw and examination showed the premolar and first molar teeth normally erupted, and pulps vital Beneath these teeth there was an oval swelling the result of thinning and expansion of the outer cortical plate and lower border of the bone, which yielded easily to pressure on the skin X-ray exami nation (Fig 1) revealed a clearly defined cavity in the bone beneath the incompletely calcified roots of the premolar and molar teeth, the latter, however, not being exposed in the bone cavity. The lower border of the bone was exceedingly thin and bulged convexly downward General physical examination, blood chemistry, etc , were normal

At operation at the Graduate Hospital, February









Fig 6 Fig 8

lig 5 Case 3 Anteroposterior x ray view showing cystic cavity in left side of mandible

Fig 6 Case 3 Lateral view of mandible before opera-

Fig 7 Case 3 Dental x ray films showing details of cyst formation in region of roots of teeth Fig 8 Case 3 Roentgenogram made 1 year after operation showing bone regeneration

13 1031 under general anesthesia because we desired not to injure the attachment of apparently normal teeth a skin incision was made over the convex lower horder of the welling and a portion of the paper like lower bony wall was removed. A quantity of clear straw colored fluid was immediate by discharged after which it was possible to examine the interior of the cavity. This had apparently bare bony walls with no lining membrane as is present in crists of detail origin. The tooth roots were seen to be covered by a thin layer of bone. The cavity was lightly spacked with gauze which was replaced several times until healing occurred. Subsequent areas studied in the cavity with new bone.

Caste 2 RP male, aged 10 years was first seen.

CASE 2 RP male, aged 19 years was first seen by us on March 15 1935 Almost 3 weeks previously, while playing basketball he received a hard hlow from an opponent s shoulder on the left side of the

lower jaw He did not recall any previous injury to the jaw After the injury he had pain and some swelling of the left side of the jaw with slight elongation and tenderness of the molar teeth fracture of the 1211 was found A few days after the niur, the arst molar tooth was removed in an effort to relieve the pain but the latter continued On examination very little swelling of the left side of the mandible was evident, but the bone was tender and the second molar was quite sore to the touch. The pulps of the remaining teeth were vital. \ ray examination by Dr W C Westcott (Fig 3) showed a large cavity with fairly well denned margins in the lelt side of the mandible extending from beneath the premolars to the third molar region. The third molar was unerupted with uncalcified roots, but did not have any connection with the bone cavity, thus chiminating the diagnosis of a dentigerous cyst. The roots of the other teeth were apparently not involved in the bone cavity March 28, 1935 5



Fig. 9 Case 4. Roentgenogram of right side of mandible showing cyst cavity before operation



Fig to Photomicrograph of section of bony wall of cost removed at operation 4 Compacta B, hemorrhage coagalism C osteolytic absorption lacunae (Dr. H. R. Churchill)

weeks after the injury, at Presbyterian Hnspital, under geoeral anesthesia an incision was made in the gum on the outer side of the teeth in the left lineer jaw Some of the very thick outer plate of the mandible was removed, thus exposing a cavity in the bone extending below the molar and premolar teeth This cavity was apparently filled with old blood, and no lining membrane was present, it evidently represented an early stage of hemorrhagic cyst formation. A small gauze pack was inserted in the opening Packing was discontinued after a few days and the wound in the mouth was allowed to close I his case has been characterized by persistent pain, somewhat relieved by later removal of the second molar tooth, but even at the present time there is a dull ache in the jaw Later x ray examinations have revealed a progressive filling in of the cavity with new hone, until at the present time the outlines of the cavity are barely discernible (Fig. 4)

CASE 3 R W H, male, aged 20 years, first con sulted us on February 10, 1936, the condition of the lower law having heen discovered about a month previously during a routine v ray examination of the teeth No pain or other symptoms was complained of, patient could recall no definite injury to the jaw Careful palpation revealed a slight thickening of the hody of the mandihle on the left side. The teeth showed no abnormalities except a large filling in the first molar The pulps of the teeth were vital

🔪 ray examination showed a large, well defined cavity in the left side of the mandible, extending from the capine to the third molar, apparently not involving the roots of the teeth (Figs 5 and 6) Dental films showed definite hony plates covering the roots, isolating them from the cavity (Fig 7)

February 13, 1936, at Preshyterian Hospital, un der general anesthesia, a skin incision was made beneath the lower horder of the maodible. The very thin external plate was removed and a large hone cavity exposed, containing clear fluid and no lining The inferior dental perve and vessels, and the finer nerves and vessels going to the roots of the teeth, were seen. A rubber dam drain was inserted and the incision partly closed. The drain was left out after to days Pathological examination of the hony wall showed nothing of special interest, except disinte grated blood debris on its inner surface X ray examination a year later revealed practically complete regeneration of hone (Fig. 8)

CASE 4. H H, female, aged 13 years, was first seen on October 6, ro36 Six months before, she had received a hlow on the lower jaw to the right of the symphysis The overlying tissues at the time became swollen and discolored, but no fracture of the mandible was found and no special treatment was given The acute swelling gradually hecame less, but some enlargement to the right of the chin persisted For the past few weeks she had complained of considerable pain in the right side of the lower jaw. probably due to a carrous molar tooth

The patient was a well nourished girl, with no complaints or abnormalities except in the region of

the lower iaw. The contour of the lower part of the right side of the face was seen to be more prominent than that of the left side Examination inside the mouth revealed a smooth, non tender bulging of the lingual and buccal plates of the right side of the mandible, extending from the first molar to the canine tooth The overlying mucous membrane was normal There were no ahnormalities of the teeth except a carious cavity in the first molar examination showed a clear cut cavity in the right side of the mandible extending from first molar to canine region, not involving roots of teeth (Fig. 9)

October 15, 1936, at Preshyteman Hospital, under ether anesthesia, an incision was made in the gum nver the outer aspect of the right side of the mandible from the first molar to the canine, beneath the roots of these teeth, and the soft tissue flap was reflected dnunward. The thin outer hony plate was easily removed, exposing a large irregular cavity in the hone, filled with clear, straw colored fluid No soft tissue was present in the cavity. The roots of the teeth were covered with a thin plate of hone and the vessels and nerves could be seen running to their apices from the main trunks Nothing more was done heyond lightly packing the cavity with gauze The packing was discontinued after a few days and the wound gradually healed Examination of a por tion of the thin bony wall showed normal compact hope with a hemorrhagic coagulum and some evidence of osteolysis on its inner surface (Fig. 1n)

SUMMARY

Attention is called to certain cystic conditions of the mandible, due to trauma insufficient to produce fracture, but causing intramedullary hemorrhage with disintegration of cancellated bone and cavity formation. These are comparable in every way to traumatic cysts of the long bones, having no epithelial lining characteristic of cysts of dental origin

Since the preparation of this paper we have encountered a fifth case in a girl of 16 years, involving the right side of the mandible, similar in every respect to those reported in detail, and operated upon on May 14, 1937

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PITUITARY BASOPHILISM

A Review of 42 Verified Cases, With a Report of a Personal Case

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URING the past 5 years increasing interest and attention have been drawn to an endocrinopathy, more commonly affecting women, in which the adrenal glands seemingly play a prominent rôle The syndrome referred to is characterized chiefly by hirsutism, ohesity, especially of the face, abdomen, and trunk. osteoporosis, cutaneous striæ, and hyperglycemia

Since 1756, when William Cooke (quoted by Oppenheimer) described a case manifesting this syndrome, numerous cases have been de scribed in the literature under various desig nations As examples Alfred Gallais in 1012 described the syndrome and termed it "le syndrome genito surrenal,' and Krabbe in 1921 outlined the syndrome which he desig nated 'adrenal hirsutism'

In 1021 Achard and Thiers likewise, dis cussed an endocrine condition which they named "diabetes of bearded women" and which was characterized by hypertrichosis of the face, obesity, hypertension and amenor rhea At autopsy hyperplasia of the adrenal glands was usually noted in these patients

The causation of this syndrome until 1032 was generally considered to be an overactivity of the suprarenal glands, induced either by simple hyperplasia of the glandular structure or by functionally active adenomas or other

types of neoplasms

Recently, patients manifesting this syn drome bave been observed who recovered completely following the removal of portions of hyperplastic adrenal glands or the enucleation of adrenal adenomas Walters and asso ciates, in 1934, recorded 2 cases in which the successful removal of suprarenal tumors brought about disappearance of all symptoms

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and return of the physical appearance of the patients to normal

On the other hand, there are recorded re ports of bilateral exploratory operations on the adrenal glands in patients with this syn drome in whom no gross evidence of supra renal tumor, hypertrophy or hyperplasia could be found Two cases of this type were re ported by Walters and his coworkers in which biopsy of specimens removed during operation from each adrenal gland exhibited no evidence of hyperplasia on microscopical examination Subsequent autopsy examina tion of the pituitary gland from one of these patients, who died I year later, disclosed an adenoma of the anterior lobe, 5 millimeters in diameter, composed of basophilic cells

In another patient recently described by Crile and his associates, a girl, aged 17 years, who manifested the chief symptoms and signs of Cushing's syndrome, improved remarkably following bilateral denervation of the adrenals and a partial adrenalectomy of one gland However, when the patient died 18 months later from acute epicarditis, autopsy revealed a chromophobe adenoma of the pituitary with possibly scattered basophilic cells The adre nal glands showed a reduction of cortical

tissue and fibrosis

The aforementioned and other similar cases recorded in the literature suggest the thought that the adrenal glands are not the only organs concerned in the production of this syndrome

In 1932, Harvey Cushing (13) collected 14 cases, in which the clinical picture was similar to that manifested by patients with tumor or hyperplasia of the adrenal cortex Ten pa tients were found to have basophilic adenomas of the pituitary body and the remainder had tumors which could not be definitely classi fied Frequently the adrenal cortex was fourd to he hypertrophied

With respect to the presence of a basophilic adenoma in the pituitary gland in cases of the syndrome, Cushing (13-17) in his treatise on the subject states

Some of these syndromes have unquestionably been due to cortico adrenal tumors and in not a few instances, indeed, such a tumor has been removed at operation with definite amelioration of symptoms What is more, in similar states, suprarenal tumors have been found after death in the absence of any recognizable abnormality in the pituitary body, though all too often the protocol refers to the exami nation of this structure, either in the briefest terms or not at all While there is every reason to concede, therefore, that a disorder of somewhat similar aspect may occur in association with pineal, with gonadal or with adrenal tumors, the fact that the peculiar polyglandular syndrome, which pains have been taken herein conservatively to describe, may accom pany a basophil adenoma in the absence of any apparent alteration in the adrenal cortex other than a possible secondary hyperplasia, will give patholo gists reason in the future more carefully to scrutinize the anterior pituitary for lesions of similar compositions

Two examples of adenomas of the anterior pituitary composed of basophilic elements were first described by Erdheim in 1903. In one, a basophilic adenoma 15 millimeters in diameter, was found in a woman 40 years old, who showed symptoms of Basedow's disease In the other, a tiny basophilic adenoma na association with an eosinophilic adenoma was discovered in the pituitary gland. This dual neoplasm occurred in an acromegalic patient 43 years of age.

Since the early report of Erdheim, a number of investigators have recorded the finding of basophilic adenomas of the hypophysis during postmortem study in patients dying from various diseases. Among these may be mentioned Simmonds, Christeller, Naegeh and Susman

Microscopic study of hypophyses removed during routine necropsy examination of persons meeting accidental death or dying from causes, apparently of non-pituitary origin, have disclosed a rather high incidence of adenomas of the pituitary gland. A study of serial sections of the pituitary bodies of 127 patients, none of whom had presented Cushing's syndrome, by Brauchli in 1927, disclosed an incidence of 21 or 31 per cent adenomas, including 3 of the basophile type. R. T. Cossiliance of the property of the

tello likewise made a similar study of 1000 pituitanes removed during routine autopsy examinations and found 40 basophilic adenomas, an incidence of 4 per cent. These studies were later confirmed by Susman, who found an incidence of 22 adenomas among 260 pituitanes, 8, or 3 1 per cent, being composed of basophilic elements, and he, therefore, concluded that this incidence of basophilic adenoma is too great to be of any special significance.

In this study we have made an exhaustive search of the literature, and collected so far as possible all recorded cases manifesting the well known symptoms of this syndrome in which autopsy or operation revealed the presence of an adenoma of the anterior pituitary gland. We have thus far succeeded in collecting 42 cases which have been tabulated in Table I.

Cases which clinically belong to this group but in which the patients are alive or in which autopsy has not been performed hive not been included in this analysis, but will be considered in a subsequent report

Since the spring of 1934 we have had under observation a patient who manifested many of the symptoms of pituitary basophilism and who received pituitary irradiation

CASE REPORT

The patient, aged 20 years (Tigs 1 and 2), an unmartied female, was first seen on April 10, 1931. Her chief complaint was swelling of the face and feet, integular menstrial periods, growth of hair on the face associated with an extensive acine like skin eruption. She had in September, 1033, been observed in the Vanderbilt Chinic, New York City, where a diagnosis of pluriglandular syndrome was made.

Her menstrual cycle which began at the age of 13 years was regular for 5 years and then became irregular. The periods recurred about every 3 or 4 months and lasted 2 or 3 days. Her last period, before coming under observation, occurred in February, 1034. She began to gain weight about a year previously, and it increased from 120 to 132 pounds. She suffered deep mental anguish because of the skin eruption and the birsuites on her face. She also became psychically depressed and physically inactive

Other prominent symptoms were extreme dryness of the skin, falling of the hair on the scalp, puffiness of the eyes, frequent urnation, polydipsia, and marked redness of the face Occasionally she complained of pain in the arms and legs, and swelling of the antles.







Fig. 1. a. Photograph of patient with pituitary basophilism, taken in 1912 prior to onset of a mittom 5. I botograph taken in 1935. The acnetium cruption is 1150le but the hairy growth has been decolorized by the patient c. Photograph taken March 3 1939, following deep pituitary irradiation Note the loss of adipose tissue in the face and chest, the improvement in color of the skin and dis appearance of the acne.

On physical examination the most striking feature was the obesity of the face and upper part of the trunk and back

The face assumed a round or moonlike appear annee. The skin was tense and of a visid hue Therere was an abnormal growth of hair especially visible on the sides of the forchead upper lip and chin. There was an acheform eruption of the face extending over the upper portion of chest both anteriority and posteriority. The breasts were of normal develop ment but showed exercal strirt. A fine hirsuites was present over the lower abdomen. The distribution of the public but rended toward the maximum type.

of the pubic bair fended toward the masculine type Rectal examination disclosed the uterus to be of normal size and in an anterior position

The systolic blood pressure was 150 millimeters and the diastolic 80 millimeters At no time did the systolic pressure exceed 13, millimeters The blood count showed, 460 000 erythrocites 7,000 leuco cites and 87 per cent hemoglobin The differential with the cell count was normal. The Wassermann with the cell count was normal. The Wassermann test performed on highlight was plus 0 per cent. The cranal contigenogram made by Dr John 1 Farrell Jr. showed a sella turcica definitely en larged, and a thinning out of the posterior chanods. A blood sugar study (arterial blood) showed the following

	mgms
First determination (fasting)	118
One half hour after glucose	100
One and one half hours after glucose	250
Two and one half hours after glucose	250

(One hundred grams of glucose given by mouth with

The patient was referred to the dermatological department for local treatment of the skin eruption since the appearance of the face was causing her mental depression bordering on a psychosis

When the patient first came under observation s diagnosis of pituitary deficiency was tentatively made. Accordingly, she was referred to Dr Farrell for irradiation of the pituitary gland with factors of treatment as follows.

934	Friter mra alu mmum	Visits amperes	Spark	Time m n	D se lance cm	Acres
May 15 May 15 May 22	1 1	5 5	9	1,	12	Re he shall Left shall Right shall Left shill

Roentgenograms taken of the spine, pelvis, and extremities disclosed no evidence of decalemeation. The blood cholesterol was rSS milligrams the

The blood cholesterol was 155 minigrans and blood calcum was 12 milligrams, and the blood pbo-pborus was 28 milligrams. Ophthalmological studies showed slight contraction of the visual fields. Retipal examinations were negative

During the course of study, the patient had a men strual period in May. Extraction of 60 cubic centi meters of urine did not show the presence of prolan

The patient's psychical state improved conider ably concurrently with improvement in the dema tological condition. She became much singlet mentally and obtained a position as a stenographer. There was however, little or no improvement in the swelling of the face or ankles or in the hirsuitism.

Because of the failure of general improvement following low dosage irradiation given in May, 1934 and the persistence of the edema of the ankles s velling of the face, persistent hirsutism, mental depression, polyuria, poly dipsia, etc., pituitary basophilism was strongly suspected. She was then referred to the roentgenologist for a series of deep irradiation of the pituitary gland, and received the following course of treatment

1934	Cop- per	Alu minum	Milli amperes	Spark	Time mm	Dis tance cm	Area
June 12 June 12 June 26 June 26	- 5	1	3 8 8 8	300 300 300	8 8 4	62	Right skull Left skull Right skull Left skull

Two months following this recourse there was noticed considerable general improvement. The redness and swelling of the face had decreased, the swelling of the ankles had disappeared entirely. The patient was mentally normal and became very active. The facial hirsuities did not improve, and the patient had not menstruated since May, 1034. However the improvement did not continue, and in January, 1035, the only permanent change noted was the disappearance of the swelling of the ankles.

An intravenous py elographic study was then made to determine, if possible, the presence of an adrenal neoplasm. This study was entirely negative. Extraction of a 24 hour specimen of urine also failed to disclose a determinable amount of estrin

These two studies negated the presence of an adrenal neoplasm. She was again referred for pituitary irradiation and received 100 per cent skin erthema dose or 550 r to each side of the skull between January 27, 1935, and February 28, 1935.

The factors in the roentgen treatment were as follows

135 kv, 5 ma, 40 cm, and 6 mm Al filter

Shortly following this administration, she was examined by Dr. Harvey Cushing, who concurred in the diagnosis of pituitary basophilism and recommended another course of pituitary irradiation which was given by Dr. Farrell as follows.

1935	Milli am peres	halo- volts	Cop- per	Alu mi num	Dis tance cm	Time min	r units	Pitus tary
April o April o April o May I	8 8 8 8	200 200 100	Y. 5.	1 1 1	50 50 50	13 13 13 13	300 300 300 300	Right Left Right Left

Two months following this series of treatments there was decided improvement in the endocrine symptoms. Hirsutism appeared to be diminished, polyuria was reduced, and the patient had a general feeling of well being.

In September, 1935, she received another course of pituitary irradiation, consisting of 300 r units to each side of the head on alternate days for four ses



Fig 2 Author's case of pituitary basophilism responding to deep roentgen therapy of the pituitary gland. Note the "moon shaped" appearance of the face and strize on breasts.

sions. No further improvement was noticed in the appearance of the face after this course of irradiation.

The basal metaholic rate was minus 7 per cent, and she was given W grain of thyroid extract three times daily. Another roentgen examination of the wrists, lower portion of the radii, ulnar, lower portion of the femora and tibus presented no evidence of decalcifcation or bony pathological changes

From March 31, 1936, to April 16, 1936, she was given another course of deep pituitary irradiation to the left and right pituitary region on six occasions under the supervision of Dr B P Widman She received 300 r units to the right and left temporal area at each treatment with the following factors

200 kv, 3/ mm Cu, 10 by 10 cm field, for a total of

TABLE I -VIRIEID CASES OF LITUITARY BYSOLUTLISM

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ļ "	Rechmann	25,00	Pace	ž.	-			-	5		L m jhike	Us pertriphs	Small thyro d	I urital adren	Die lafter opera
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~	Parkes Neber 1926	24	=	į	S.	ë				Dyspnes ex I hthal mys neth itis	Bay phile a lenoma	hormal structure	Atretie , na be		I ulmonary edema
10	J Nauer 1930	Signa	,	=	re ,	÷	=	2. g	3	Increased metaby ism	Baw phile aden ma	Vormal		A Irenal	En sipelas port
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BLAND, GOLDSTEIN PITUITARY BASOPHILISM

TABLE 1-VERIFIED CASES OF PITUITARY BASOPHILISM-Continued

	Cause of death		Not mentioned				Broncho- pneumonia	Nephritis	Nephritis				Freemons, 3 months after operation		
	Treatment	Medical	Thyroid				Pituitary irradiation			Eaploratory operation			ray to putu tlary and thymus par tual adrenalec tomy		
ngs		Hypertrophy Fatty parathyroids	Fatty parathyroids	Atrophic gonads	Fatty parathyroids Labrace scirrhosis Colloid goiter					Hypertrophy Cystic ovaries	Collord goster	Hyperplasia Atrophic ovaries			Adenoma of para thyroid Atrophic
Pathological findings	Adrenals	Hypertrophy	Not men		Not men tioned	Not men tioned	Hypertrophy	Not men tioned	llypettrophy	Курстиорау	Normal	Курегріазіа	Normal	Hyperplasia	Not men toned
Ps	Pitutary	Basophilic	Т	basophilic cella	Basophilic	Basophilic adenoma	Basophile	Basophile adenoma	Basophilic adenoma	Basophilic adenoma	Basophilic	Bayophilic byperplasia	Basophilic	Basophilic	Basophile
	Other symptoms	Edema of legs car	Unit in protection	dyspoea pulmonary edema	Polyneurits (alco holic) ascites	Fatigue pains in legs vertigo	Headache dyspnea	Headache nephritis ecchymoses	Nephritis	Emotional disturb- ance dyspnea cyanosis	Ayphosis abdominal pains broncho-	Dyspnea weakness cyanosis	Headache, edema of extremiles	Depression sepsis	Tachycarda pams in legs fatigue head ache
	Hyper ten mon	12	Ť		12		Yes		20		å	Yes	2		ia
	Skel Skel	3	Ť		ž	5	13	ટ્ર			3			1:5	13
	Glyeo-	T	1		1	2	2			Yes	No.			Г	3.
ptoms	Abdo minal strik	1	İ	5		=	12	Yes	100				بو	Ī	, ses
Chef symptoms	lirsu tism	3	Ì	<u>.</u>		ĺ	13	2	22	13	7.51	Yes	3	1 es) es
"	Amen Hisu orrhea tism	3	İ	ž.	Post	Di min	0 3	Impo	2	Hypo- men orrhea		Meoo	Yea	Yes	× Kes
	a co	3	Ì	3,	Ϋ́ει	200	1	13	12	12	168	1,63	5	E.	3
	Age	1	 ,	54	54	22	8 L	~>	~ E4	3	24	~4	Ž.	24	5,4
	Author	Participant	1933	Rutishauser 1933	Rutishauser	Marburg 1933	Craig and Crai	Russell Evans and Crooke	Russell, Evans and Crooke	Josephson and Berg strand	Raab 1934	Greppi and Redaelli	Walters Wilder and Kepler 1934	Klein	Jonas
	ž	ŀ	2	=	SZ.	12	18	=	=	12	#	2	92	2	82

TABLE 1-VLRIFIED CASES OF PITUTARY BASOPIILISM-Continued

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Managiti 15 Lea Ves Vin Aus Ves Vin Aus Sin 142 1535	Let Yes Ym Ym Yes Yes	Yes Yes Yes Yes Yes	Yes Yes Yes	Yes Yes	Yee Yes	٥		2		Headache carduc fasture pause ta legs	Basephile adetoma	Normal	Hyperplastic thy roud and para thyroids Atrophic ovaries		Cardiac failure
1933chnud 18 Yee Loss tes des des des des des des des des des d	Yes Loss Yes Yes Yes	Loss les les les les les les les les les l	les hes hes)es)es)es)es	i,		3	-	Dyspace polydipus edema of feet turn bage polywna	Basophile adenoma	Small adenoma of cortex	Atrophic testicles Ad nome of thyroid	Pituitary irradiation	
Horneck es tes Loss Femi Ves No Ves No 4935	kes Loss Femi Yee No Yes	Loss Femi Yes No Yes of hibido type	Emi Yee No Yes	Yes No Yes	No	2		ž		Dyspaca penes delably	Small adenoma (wounophilac)		Atrophic testacice	Medicel	Cardiac failure Tuberculoue pfeurisy
1935 34 1ee 1 es Yes 1 es 1 es Yes Yes 1935	1cc 1cc Ym 1cc 1cc Yc.	Yes Yes Yes Yes	Yes hes Yes	Yes Yes	Yes Yes	Yes		3		Pains in extremilies	Bas sphile adenoma	Hyperplatua and small adenoma	Enlarged parathy rouls Atrophic evaries	Xray	
Gouley 3y Yes 1 tes Yes Yes Yes Yes Yes	Yes Yes Yes	Yes Yes	Yes Yes	Yes Yes	7.87	7.87	_	,	_	Dyspnea headacte	Basephilic		Scienciae ovaties	Medical	Cerebral apoplexy
MacCallum 19 Ves Ves 1es 1es Ves Nes 1es 1sts 1sts 1sts 1sts	Yes Yes hes hes Yes	Yes hes hes Yes	les Yes	Ye.	ů,		<u>;</u>			Dyspnes polyutra	Barophile adenoma	Enlarged (portmal)			Died after pyalocystotoopy
1935 28 Yas Yes Yes Yes Yes Yes Yes Yes Yes	Yas Yas Yas Yas Yas	Yes Yes Yes Yes	Yes Yes Yes	Yes Yes	Yes	Yes		2	_		Atypical chro- mophobe adedoina	Patient living		Operation	Recovery after operation
A Yes Yes les	les Yes Yes les Yes Yes	Yes Yes les Yes Yes	Yes les Yes Yes	les Yes Yes	Yes Yes	χes		Š			Macroscopic basophdic adenoma	Carcinotas of adrenals			Dued after adrabatectomy
11 tes Yes Yes	ter Yes 1st	Yes Ne	Yes Yes	Ya Ye			-	1	1	Convaisions bead ache abdominati panta	1	Liyperplasss and adenoma	Normal para	A ray	Dued after appendectomy
10 Tes 153	Yes her) to) to	e.	<u>.</u>	<u>.</u>			2	-	Renal color	Basophiic	Hypertrophy		Medical	Renal colic
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a M Yes Lose hes hes	Yes Lose 1es 1es 1bsde	Lose las	Lose las	la la	Ъв.			X		Polynta polydipus	Besophile	Norma	Ovance atretic latty parathy rolds	Ifoor pitu thay irre duatu a Ad rened opera	Pulmonary edema Preumona septicemia
1930 F State No les	orbes	orbes	orbes	Yes No	ž			٠	*	katigue merupansen headsche palyer themia	Chromophoke ndenoma with seat t rel base- pa i c 11	M duction of ad cast		Adre al dener valt n par tial adea slectomy	Acuta to Card tog (135 y ra post operatuve)

From June 2, 1936, to June 30, 1936, she received 5 treatments with the same factors, but with a field of 4 by 5 centimeters for a total of 2 times 750 r units to the right and left temporal region and direct to the pituitary region. At this time roentgenography showed the sella turcica to he normal, and there was no roentgen evidence of rarefaction in the bones of the right arm or right leg.

No immediate results were noticed after this course of deep irradiation. There was a loss of hair at the site of irradiation. The blood calcium study showed of smilligrams per 100 cubic centimeters. Roentgenogram of the sella turcia disclosed it to he within

normal range

In October, 1936, the patient again consulted Dr Harvey Cushing at the New Hauen Hospital While under his observation, roentgenographic study of the adrenal glands was made with negative results Since then, there has been a steady and progressive improvement in the hirsuitism and obesity. The patient has lost 13 pounds in weight and on January 26, 1937, weighed 122 pounds. The cyanotic color and cane of the face have completely disappeared. The swelling of the face has been reduced remarkahly. There has also heen a decided improvement in the posture, the tendency to kyphosis having disappeared A period occurred in October, 1936, but not since Prohabily the improvement was the result of the last course of deep irradiation of the pituitary gland

This patient exhibited the promunent features emphasized by Cushing as heing manifestations of hasophilic adenoma of the pituitary hody

These are in the order of their importance (r) plethoric obesity of the face, (2) hirsuitism, (3) amenorrhea, (4) cutaneous stria, and (5) metaholic disturbances

Obesity The ohesity with swelling of the face was the most conspicuous feature in our patient. The change that occurred in the appearance of the face may be observed in comparing the photographs in Figure r. Ohesity of the face and trunk, with tendency toward kyphosis, was present in the entire group of cases recorded in Tahle I, with one exception.

Hissuism This symptom was noted in 29 of the female patients. It is often the chief complaint of patients suffering with this endo-crinopathy. The abnormal growth of har occurs on the sides of the face, upper lip, and on the chin. There is usually a growth of har on the lower portion of the abdomen assuming masculine type of distribution.

Amenorrhea Amenorrhea was the most constant menstrual disturbance noted, this finding being present in 23 cases Four patients were either menopausal or postmenopausal or had heen castrated hy previous operation, whereas, in only I patient was amenorrhea noted as heing absent (Loss of lihido or sexual impotence was a constant finding in the male. 8 battents)

Skeletal decalcification Although skeletal decalcification has heen observed in the majority of reported venfied cases, at no time did our patient exhibit any climical signs or roentgen findings suggesting osteoporosis. This may possibly he attributed to the early institution of deep irradiation of the pituitary gland Skeletal decalcification was detected hy roentgenography or found at autopsy in 27 cases, or 80 per cent of the 33 cases, recorded in Table I, in which this finding was mentioned.

Age The ages of the patients, at the time of the reports, ranged from 11 years to 65 years

Sex This syndrome is overwhelmingly more commonly encountered and recognized in the female

In the cases herewith recorded, there were 32 in females and 10 in males

Other symptoms Hypertension was noted in 25 cases or 86 per cent of the 29 cases where this symptom was recorded Ahdominal strue were observed and recorded in 27 cases Among other prominent symptoms noted may be mentioned asthema, headache, dyspinea, psychosis, emotional disturbances, polydipsia, polyphagia, ecchymoses, pains in the extremities, tachycardia, and convulsions

Laboratory findings The basal metabolic rate seemingly had no pronounced alteration in the reported cases, heing low in some and high in others. No marked changes in the calcium content of the blood are accompaniments of hasophilism. A number of the patients showed high values of blood calcium, while the calcium level was within normal limits in others. Polycythemia has heen noted in several of the reported cases.

OUTCOME

Pulmonary complications and symptoms referable to the cardiovascular system were a common feature in the cases described For example, the termination in 8 or 24 per cent

of the 30 patients in whom the cause of death was recorded, was by pulmonary edema or cardiac failure

That patients with pituitary basophilia cannot withstand operative measures and are poor risks for any type of surgical procedure is shown by the fact that o patients succumbed after operation of one type or another Five patients were operated upon for suspected adrenal neoplasm, and they all died following partial or total adrenalectomy (Freyberg, Lescher, Fuller, Reichmann, and Bauer) It is of absorbing interest to note that in only one of these patients was an adrenal neoplasm found at operation Later at autopsy a min ute basophilic adenoma was discovered in the pituitary gland (Lescher) One patient, de scribed by Moehlig, died following thyroidectomy Of 2 patients operated upon for the removal of pituitary tumor, one succumbed, while the other made a good recovery with cessation of the symptoms (Lisser) One patient, who had improved somewhat as a result of pituitary irradiation, died subsequently after an appendectomy (Wright) One case terminated fatally from infection following direct pyelocystoscopy

Patients with this peculiar endocrinopathy are, in addition to heing poor surgical risks, all liable to various types of general as well as der matological infections, a patients diedof ery sip elas and 1 from sepsis as a result of a severe skin infection.

n infection Diagnosis

Since, in numerous cases reported in the literature, similar clinical phenomena may be found associated with or due to neoplasm of the adrenal cortex, the diagnosis of pituliary hasophilism must rest on the exclusion of adrenal cortical tumor or hypertrophy. There is an increasing number of cases in which oper ative removal of adrenal cortical neoplasms has resulted in complete recovery with disappearance of the distressing symptoms. However, cases are recorded in which exploratory operations have resulted in death of the patients without the disclosure of any trace of either adrenal hypertrophy or neoplasm.

To avoid accidents of this nature it is extremely important to direct all efforts of therapy toward the pituitary gland before entertaining any operative procedure on the adrenal glands

Since basophilic adenomas of the pituitary body are so small that bony alterations are not, as a rule, produced, roentgenography of the sella turcica is of no aid in the diagnosis of the condition. Likewise, contraction of the visual fields has only occasionally been observed in cases of pituitary basophilism. There was only slight contraction of the visual fields, taken repeatedly, in the patient here with properties.

with reported A recent perfection in the technique of roentgenography has become an important adjuvant in the diagnosis of tumors and hy pertrophy of the adrenal gland The x ray is of special value in cases in which no palpable mass is present Recently, a method has been developed of visualizing the suprarenal gland by the injection of a measured amount of air directly into the perirenal space by hand pressure (Cahill) This worker found that the injected air would more or less slowly infil trate through the fascial planes so that expo sures 12 to 36 hours later would show the organ and fascial planes clearly, especially around the adrenal gland This method has been found of value in demonstrating both the pathological as well as the normal adrenal gland

PATHOLOGY

Forty-one of the 42 patients studied in this survey were examined post mortem, and micro scopic examination was made of the hypophyses. A chromophobe adenoma was removed successfully by operation in the case reported by Lisser. A specific diagnosis of hasophilic adenoma was made in 35 cases, while only an "increase in basophilic cells" was reported in r case.

Two of the neoplasms were described as "eosinophilic" adenomas, and in r case reported by Cushing (13), the tumor was noted as a "large invasive adenoma"

In the case reported by Wieth Pedersen (38), an adenoma composed of non granular elements was found at autopsy, while chromo phohe adenomas were disclosed in the cases reported by Fuller and Crile

Postmortem study of the suprarenal glands was completed and recorded by 29 authors in 29 Cases Hyperplasta or hypertrophy of the adrenal cortex alone or with definite adeno matous formation was a strikingly frequent occurrence Varying degrees of hyperplasta or hypertrophy were encountered in the removed adrenal glands of 18 patients, or 63 per eent of the 29 cases, and in addition to hypertrophy, a definite adenoma of the cortex was found in 4 cases (Anderson, Wright, Hildebrand, and Hora)

The adrenal glands were noted as entirely normal in only 8 instances, or an incidence of

26 per cent

Carcinoma of the adrenal gland was found in r case (35), while hypoplasia of the suprarenal cortex was present in Freyherg's case

The high incidence of secondary hyperplastic changes in the adrenal glands in pituitary basophilism may, according to Cushing (17), hear the same causative relationship to hasophilic adenomas of the pituitary as do the frequently associated adenomas of the adrenal cortex to acidophilic adenomas of acromegaly

Atrophy or atresia of the ovaries was a common finding, being reported in 16 cases A fatty condition of the parathyroids was

also a fairly common necropsy finding

In Schmorl's case, there was observed hyperplasia of the parathyroids without adenomatous formation

In several cases there was found an enlargement of the thyroid or a colloid goiter

In many of the cases reported, the thymus gland was atrophic, in some it was replaced by fat, and in a few it was normal in size. In the cases reported by Teel and Freyberg, the thymus glands were hyperplastic and definitely enlarged. The role played by the thymus in this syndrome is probably not important, although several cases are on record in which neoplasms of the thymus were associated with a climical syndrome identical with basophilia (Leyton, 36, Kepler).

With respect to the pathology of Cushing s disease, Crooke (23) states "that the only factor common to the syndrome, regardless of whether the pituitary or adrenal gland be the site of tumor formation, is a hyaline change in the basophilic cells of the anterior hypophysis which apparently is not an expression of altered physiological activity"

In association with the chromophobe adenoma of the pituitary gland reported by Fuller there was noted hyaline change in the cytoplasm of the basophile cells

In 3 cases of Cushing's syndrome reported hy Rasmussen, in which no pituitary adenoma was found, but in one of which a carcinoma of the adrenal gland was present, the pituitary sections showed extensive hyaline changes in the hasophiles of the anterior lobe and in some of the hasophiles of the posterior lobe. These nuclear changes were also noted by Harc and his associates in the pituitary gland removed from a patient with carcinoma of the adrenal gland.

MacCallum and his co-workers found in their case of hasophile adenoma that the hasophile cells of the neoplasm, as well as those of the pars intermedia, remained unstained with copper hematoxylin, whereas the hasophiles of the antenor lobe stained black. For this reason, they believe the tumor is derived from

the pars intermedia cells

Recently, Cushing (16) has demonstrated the presence of hasophilic infiltration of the pars nervosa of pituitary glands in 6 fatal cases of eclampsia In 4 cases in which the patients had shown marked hypertension, an excessive hasophilic infiltration of the postenor pituitary gland was found. A similar condition has been observed by Cushing in a number of glands from fatal cases of essential or nephrovascular hypertension The hypertension, as well as the other effects, such as the derangements of fat, carbohydrates and water metabolism (obesity, hyperglycemia. edema, polydipsia, polyuria) encountered so regularly in pituitary basophilism, are doubtless manifestations of posterior lobe activation resulting from the secretory activity of the hasophilic cells

However, controversial evidence exists only regarding the character of the endocrine principle produced by the overactive basophilic elements. Zondek, for example, concludes in his study that prolain is derived from the hasophilic elements of the anterior lobe. Anselmino and his co-workers showed that the blood of eclamptic patients with edema and hypertension contains antidiuretic and pressor substances. They believe that an overproduc-

tion of posterior pituitary hormone rifers the only proper explanation of the posterior pituitary phenomena met with in basophilism, eclampsia, and essential hypertension

It, therefore, is justifiable to assume, for the time being at least, that the hypertensive disorders and sequelic as well as posterior pituitary manifestations encountered in basophila have their source in the posterior libe of the pituitary body, and that the symptoms are induced by secretory activity of the excessive production of basophile elements.

TREATMENT

In cases in which the syndrome is present, coinciding with that found in the venfied cases of pituitary basophilism, treatment should be directed to the pituitary gland Exceptions to this rule should be made only in those cases in which definite evidence of adrenal neonlasm is obtained

The hest procedure, in cases in which the causative lesions cannot definitely be determined, is to administer deep roentgen therapy to the pituitary. If prolonged thorough roent gen treatment of the gland fails to bring about progressive improvement in the endocrine condition, exploratory operation on the adrenal glands may then he considered

Roentgen therapy had heen employed in 7 asses described in Table I In the case re ported by Wright, noticeable improvement in the health of the patient took place fallowing x ray therapy until death intervened after an appendectomy

Two courses of deep roentgen therapy were applied to the pituitary gland in the case described by Craig and Cran, but death from pneumonia occurred before improvement was noted

Roentgen therapy bad been used in several other cases listed in our study, but the patients bad been so seriously affected by cardin vascular and other nrgame changes that death super-ened before the effect of this method of therapy could be evaluated.

Radiation of the pituitary gland has, in some instances, caused the disappearance of all the abnormalities in patients showing the symptoms of this syndrome. In the cases reported by Jamin, Wohl, and others, pro

nounced improvement followed deep x ray therapy. The question of x ray treatment of unvertised cases, bowever, is a subject which will be discussed in a later report.

On the assumption that the manifestations of Cushing's syndrome are due in large part to adrenal hyperactivity, Crile and associates have performed denervation and partial resection of the adrenal glands in cases of this character and obtained alleviation of the symptoms

Oppenheimer states that it seems to him, "in a particular case after a tentative trial of roentgen therapy to the brain without im provement, one should explore both adrenals surgically, possibly, also the ovaries, seeking to find a tumor, the removal of which may cure the patient" On the other hand, Kepler and associates who obtained some degree of suc cess in operative removal of adrenal adenomas, and resection of hyperplastic adrenal tissue, believe it a better plan to operate aist on the adrenal glands and to treat the pitutary gland later, if no pathological alteration in the adrenals is found. However, this procedure, it seems to the writers, may unnecesarily expose the patients to the dangers of surgical maneuvers which may not prove of benefit

SLAMARY

r The clinical course of a personal case of pituitary basophilism in a grif to years old under observation for a period of 3 years is described Osteoporosis and bypertension, two symptoms usually found, were not present in the case recorded The patient made a pronnunced improvement after receiving several courses in deep roentgen irradiation to the pituitary gland

2 The special features of 42 verified case in pitutary basophilism are tabulated and analyzed A demnte diagnosis of basophile adenima was made in 35 cases, an increase in basophilic cells was reported in 1 case A chromophobe adenoma was successfully removed by aperation in 1 case In the 5 remaining patients, the pitutanes disclosed adenomas composed of chromophobe or cosmophile elements.

3 Thirty two patients were female, and 10 were male

- 4 The most conspicuous clinical features of basophilic adenoma are as follows (r) plethoric obesity, especially of the face, (2) hirsutism, (3) amenorrhea (impotence or loss of libido in the male), (4) cutaneous striæ, (5) osteoporosis, (6) hypertension, and (7) glyco-
- 5 Other symptoms of prominence are headache, asthenia, pains in the extremities, polyphagia, polydipsia, and symptoms referable to the cardiovascular and respiratory systems
- 6 Death in the recorded cases was usually due to infections of various types or pulmonary complications Patients with hasophilic adenoma of the pituitary cannot withstand any type of infection, not even one of a minor nature
- 7 Hypertrophy of the adrenals was an associated finding in 18 or 63 per cent of 29 cases in which the adrenal condition was described In 3 cases definite adenomas of the adrenals were also present. The association of adrenal hypertrophy and adenomas is also encountered and has long been known to be a definite association of acromegaly
- 8 Five patients were operated upon for suspected adrenal neoplasms and all died following operation. In only 1 patient was an adrenal tumor found to be present at the time operation was performed. Later at autopsy a minute basophilic adenoma was discovered in the pituitary gland
- q Therapy for patients exhibiting the manifestations of Cushing's syndrome should consist in deep roentgen (high voltage) irradiation of the pituitary gland Irradiations of high dosage should be employed (300 to 1200 r units to each side of the bead) This should be repeated every 4 to 6 months, if only slight or no improvement occurs Patients with this syndrome apparently withstand large exposures of irradiation very well and show no ill
- 10 Finally, the authors believe that patients with the clinical syndrome of pituitary basophilism should not be exposed to the risks of adrenal exploration, unless definite evidence of tumor is found, or repeated high voltage irradiation therapy has failed to bring about improvement

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ROENTGENTHERAPY IN EPITHELIOMAS OF THE MAXILLARY SINUS

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AT THE present time the technique most widely used in the treatment of epitheliomas of the superior maniform of the superior maniform of the superior maniform of the superior maniform of the district of the cavity by means of tubes of radium placed in the interior of the operative field. Telecuretherapy or roentgentherapy, hefore or after operation, however, are used in addition in certain clinics. These procedures give an appreciable precentage of cure in expert hands

In a total of 72 patients with epithehomas of the maxillary sinus, admitted for treatment at the Foundation Curie from 1919 to 1934, a small group of 10 patients was treated by roentgentherapy alone. It is this group of patients which forms the basis of this work.

CLINICAL STUDY

The early diagnosis of epitheliomas of the maxillary sinus is exceptional. The tumor forms in a cavity where it can develop silently without causing symptoms. At times there is a slight serous discharge from the nose which, inassociated with pain, is confounded with simple coryza. Sometimes, in those forms arising in the suprastructure of the maxilla, the patient notes, 2 or 3 months hefore the first painful symptoms nasal hemorrhage which may last for several hours, yet which rarely leads to an early diagnosis.

The alarming symptoms appear when the tumor invades the neighboring regions and opens a tract from the sinus. These symptoms vary according to the site of origin of the growth. A classification of these sites of origin is thus necessary and of importance both in arriving at a diagnosis and in deciding upon the method of treatment.

Suprastructure Tumors which arise in the superior half of the maxillary sinus at the oninstitut du Radium de 10m ersité de Pans Professor Cl Regaud Service de Roentgentherspie de la Fondation Cume Dr Contard set have the most dormant development As soon as they invade the orbital cavity, however, the distortion of the region makes the diagnosis easy. These tumors fall into two groups the external and the antero-internal

Tumors of the suprastructure which grow citernally arise in the summit of the pyramid shaped antrum They rapidly invade the malar bone, but cause only slight infra-orbital pain A tumefaction of the external angle of the floor of the orbit then appears and there is an associated infra-orbital, frontal, and temporal pain, which increases as the tumor grows larger Invasion of the orbital cavity is brought about by infraction of the external part of the orbital floor The eye is deviated upward and inward, the palpebral fissure becomes oblique from within outward and from below upward (Figs 6 and 8) The temporal fossa is affected by invasion of the zygomatic process or through the external wall of the orbit Adenopathy, rare in these cases, is limited to a small pre-auricular gland

The antero-internal tumors arise on the uppermost portion of the anterior wall of the sinus at the junction with the nasal fossa The patient complains of slight infra-orbital pain and there is a progressively increasing nasal discharge and obstruction quently finds in these patients large polyps involving the turbinates, the polyps may have heen removed on several occasions but without establishing the diagnosis of neoplasm The tumor gradually deforms the infraorbital region, the lacrymal sac becomes infected, suppurates, or is invaded, and paininfra orbital, medial, frontal, and parietalsometimes very intense, makes its appearance (Fig 1)

The invasion of the floor of the orbit results from the infraction of the internal half. The eye is displaced upward and outward, tending more and more to become exteriorized. The anterior ethnicidal cells are affected from the



Fig. 7 Epithelioma of the suprastructure of the maxilla. Antero internal form

beginning as is at times the frontal sinus. We have never observed adenopathy in this form

Infrastructure Infrastructure tumors de
eloop in contact with the dental roots and
their nerves Vlarming symptoms are therefore observed earlier in the course of develop
ment than in those tumors of the supra
structure However, although the patient
may consult bis dentist early, the diagnosis of
neoplasm is often established late

Antere external tumors arise in the anterior part of the sinus, at the union of the anterior external wall and the septum dividing the sinus and the nasal fossa. The patient may seek consultation because of pain of deotal origin which may accompany the loosening of the tooth, a premolar or the first molar tooth may be affected. After extraction of the tooth the pain persists. The diagnosis of dental cyst may then he made, and it is often during the course of operation for this cyst that the real diagnosis is made

Development of the tumor terst takes place anterioris and laterally, becoming so large that at times there is considerable disfigure ment to the maxillary region (Fig. 2) The naso antral wall and the inferior turbinate are displaced medially, thus gradually obstructing the nasal cavity



Fig 2 Epithelioma of the infrastructure of the maxilla.

Invasion of the hard palate through the onto the gingit-object and the microsimoto the gingit-object success progressrapidly without eliciting ven great pain Submanillary adenopathy is observed often in these patients and especially after buccal invasion has begun

Positeror tumors arise at the junction of the postero inferior and internal walls of the sinus It is the rarest form and that in which the diagnosis is most tard. Pain is often the his symptom and is diffuse. Its cause is usually attributed to an accident to a wisdom tooth, an unerupted tooth, or a dental cyst. Trismusoften appears early or closely follows the pain. The posterior molars hecome loose and fall, if they have not already been extracted due to an error in diagnosis.

The tumor grows inwardly toward the pterigomatuliary fossa and the swelling is noticed externally. Ethmoidal my asion takes place through the posterior ethmoidal cells Superior carotid and angulomaxillary adenopathy is not rare.

Secondary infection These tumors have a marked tendency to spontaneous necross and once having opened into the buccal cavity or nasal fossa, they present a large gangrenous

surface, infected, and with a necrotic odor This secondary infection is neither a contraindication nor an obstacle to treatment

It has been noted that all the tumors of the buccopharyngeal regions—voluminous, proliferating, infected, and malodorous—henefit greatly by irradiation, which seems to he for them the most efficacious of disinfectants Moreover, many of these tumors are highly sensitive to radiotherapy

Infection associated with epithelioma of the maxillary sinus in particular becomes an obstacle only when the infection involves the other sinuses thus provoking a purulent pansinusitis

Malignancy Although these tumors are considered to be highly malignant, they seem to react differently, in fact, (r) no instance of distant metastasis has been observed, (2) invasion of the glands is rarely early, (3) patient remains in good general condition for a long time

ROENTGENOGRAPHY

Roentgenographic study of the manilary since steen to the lesson. The tumors, on clinical examination, often appear localized to one or another portion of the manilary structure, but with the x-ray they are found to be of much greater extent. The roentgenogram reveals not only the extent of the invasion, but the condition of the manilary and malar bones, of the floor of the orbit, of the hard palate, at times it reveals that the lesson has spread even into the pterygomaxillary fossa. These facts are not always brought out in the clinical examination nor does the symptomatology reveal them.

Roentgenographic examination often demoritates an opacity of the ethmoid cells and frontal sinus. In the absence of bone infraction or destruction, this opacity does not indicate definitely a neoplastic invasion of these regions. It does point to the possibility of such an invasion and is an indication that these regions should necessarily be included in the field of irradiation.

HISTOPATHOLOGY

The majority of tumors of the superior maxilla are epitheliomas. The lymphosar-



Fig 3 Epidermoid pavement epithelioma of the maxillary sinus Variety of epithelioma most often en countered ×50

comas found in this region are usually the result of propagation from timors arising in the nasopharynx. The proportion of connective tissue tumors to epitheliomas is about 1 to 10 For a long time beinging in cell timors of the maxilla have been included with the connective tissue tumors of the region, and thus it came to be believed that connective tissue tumors were as frequent as epitheliomas. In reality such tumors are rare

Epitheliomas of the maxillary sinus which arise from a cylindrical mucosa susceptible to metaplasia, in the great majority of cases, belong to the group of epidermoid pavement epitheliamas They have the characteristics of tumors which arise from epidermal coverings stratification of the cellular elements and successive transformation of these to resemble elements of the skin and dermopapillary mucosæ Eight of our 10 cases belong in this group In addition they all present a mucosal type of epidermoid evolution, with stratification most often complete, sometimes alternating, hut with basal cells predominating, and with keratinization by foci or isolated cells rather than hy the formation of epithelial pearls (Fig 3)

Large, clear cells presenting monstrosities

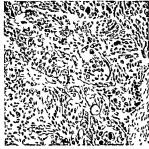


Fig 4 Epidermoid pavement epithelioma of the maxillary sinus Same case as in preceding figure ×1,0

are often observed, recalling those seen in epitheliomas recently irradiated (Fig 4) Mittoses are usually numerous. Spontaneous occrosis in the center of the sheets of cells is frequent.

Two of our cases were non epidermoid epitheitomas. One was composed of small uniform cells architecturally arranged in large sheets or conjoined nodules, and proved to be very radiosensitive. The other was a massive epithelioma which had invaded the muscle, and contrary to the finding in the first case, was only slightly radiosensitive.

TREATMENT

All these patients were treated by roent genotherapy alone, for the reason that it would have heen impossible to remove the lesion completely no matter how extensive the surgical extirpation

Dental extractions A was precaution is to extract before treatment all the teeth of the superior and inferior maxillæ of the affected side no matter what their condition and as well all other teeth of the opposite side in questionable repair. We helieve that it is preferable to extract generously. Teeth in bad condition are often the cause of early necrosis of the maxilla. One of our patients refused

extraction, and at the completion of treatment presented necrosis of the inferior maxilla, its origin and development from and around a dental root could be followed

Following irradiation of tumors of the pharynx and oral cavity, very often late deotal lesions are observed, even in the teeth which are in good condition before irradiation These dental lesions, which vary in severity and in rapidity of development, at times con stitute multiple portals of entry for infection which, when it reaches the irradiated maxilla, may cause a late necrosis and jeopardize the cure of the patient A patient who had been pronounced cured of an epithelioma of the bard palate returned 6 months after treatment presenting dental lesions which had caused necrosis of the inferior maxilla. We have just observed two other patients who were cured of epitheliomas of the tonsil 8 years ago and who developed dental lesions At the present time both patients have necrosis, one patient of the inferior maxilla, the other of the superior maxilla

We believe, therefore, that in all patients subjected to irradiation of the oropharyngea regions, the safest procedure is to remove all teeth, especially if the teeth are not in good condition and to await for complete healing of the gums before irradiation is hegun. One is often obliged to be content with a less radical procedure.

Physical factors The voltage employed has been from 180 to 200 kilovolts If the tumor remains localized and especially it it is superficial, it seems sufficient to sterilize these tumors The metnesity of the secondary current in the tube has been 3 to 4 milliamperes, it is probable, however, that these forms of cancer with relatively slight differentiation could be treated without ill effect with higher intensities.

The anticathode slin distance we use 15/0 to 60 centimeters The average hourly dose has been from 150 to 250 per hour, or 25 to 4 r per minute The filtration has been 2 millimeters of copper and 3 millimeters of alumnum

Portals of entry Two unilateral fields of 70 to 120 square centimeters have most often been used—one anterior and the other lateral,

each covering the entire primary lesson. There is therefore a large zone of superimposition. Sometimes a third field, with the rays applied over the opposite side has been used, but the first two portails of entry are the most important and usually suffice.

If there exists a submaxillary or carotid adenopathy, it may not be practicable to include both the primary lesson and the gland area in one field. In such cases, it may be preferable to use an additional field to cover the gland area. If the adenopathy is only suspected or is not voluminous, it can be treated

after the primary lesion

Ocular protection. In the lesions limited to the infra-maxillary structure of the supernor maxilla, the eye is outside the zone of invasion, hence is not irradiated. In the extensive cases, however, or in those in which the growth is limited to the suprastructure, the eye is in contact with the neoplastic mass and must necessarily be subjected to irradiation.

If the eye receives the total dose necessary to sterilize the tumor, there is produced a more or less serious injury to the eye, depending on the intensity of the treatment

- If treatment consists of intense daily doses given over a short period of time, there is produced an ulcer on the cornea which, in the months following treatment, may necessitate enucleation
- 2 If the treatment is of moderate intensity, the eye may remain intact, but there is a definite epilation of the lids accompanied by chronic conjunctivitis with tearing which can be more uncomfortable to the patient than the loss of the eye
- 3 If the treatment is of low intensity, there is no definite epilation of the lids and the patient conserves normal vision. At the end of 2 or 3 years, however, the vision becomes less acute and finally is lost

If the treatment is prolonged over several weeks, the eye can be protected after the first portion of the irradiation has acted upon the periphery of the tumor. In one of our patients, Case 7, who received 7300 r in 42 days, the eye was protected after having received 2500 r in the first 25 days of treatment and normal vision is conserved at the present time, 5 years after treatment (Fig. o)



Fig 5 Epithelioma of the suprastructure of the maxilla treated by nontgentherapy in 12 days, Case 2 Loss of eye Late radionecrosis of skin healed Cure of 15 years' duration

The fields are irradiated without protection of the eye of the affected side, during the first 3 or 4 weeks of treatment, during the course of which a dose of about 2000 to 2500 r is administered Irradiation is then continued but the eye is protected by means of a shadow projected on it by a lead rod 5 millimeters in thickness and I 5 centimeters in diameter. which, placed at a distance of 15 to 20 centimeters from the eye in the beam of the rays, stop those rays which could otherwise fall directly upon the eye and on the borders of the lids (protection at a distance) Toward the end of the treatment one adds to this protection an oval shell of lead encased in wax, 3 millimeters in thickness and 25 by 3 centimeters in diameter, which is placed either directly in front of, or lateral to, the eye in the path of the anterior or lateral beam (direct protection)

Prolongation of treatment The duration of the treatment depends upon the climical conditions in the individual case and upon the anatomical characteristics of the region irradiated. For instance, epitheliomas histologically slightly differentiated, as those of the maullary sinus, can be sterilized as well by treatment over a short period of only r5 days as over a longer period of 40 to 50 days.



Figs 6 and 7 Case 4 Epithelioma of the suprastructure of the maxilla, external form Roentgentherapy in 18 days Loss of vision of left eye 2 years after treatment Atrophy and telanguectass of skin Cure of 7 years duration At left taken in 1939 at right in 1937

On the other hand, the anatomy of the region and the conservation of bealthy tissue traversed by the beam leads one forcibly toward treatment prolonged over several weeks. Our conclusions from cases treated are as follows.

r Treatments extending over a period of z weeks or less rarely produce stenlization of the neoplasm, in fact, if sterilization is secured it is at the expense of the eye, which must be enucleated. Also there are the concomitant radio necrotic accidents to the skin or bone from which the patient does not always survive. Such short courses of treatment are not advisable even when only palliative treatment is attempted, for they provide a rapid sloughing of the neoplasm and this is followed by a lowering of the general condition. Death may result very rapidly from such a procedure, especially in older patients.

² Treatment extended over 3 to 4 weeks can produce sternlization but there is always the possibility that vision in the irradiated eye will be sacrificed because in treatment over such a short period of time protection of the eye might compromise the cure, moreover, skin modifications—atrophy, telangicitasis, sclerosis—are always marked 3 Treatment extended over 5 to 6 weeks permits of sterilization under the most favorable conditions, with conservation of the eye and vision because the eye can be protected during part of the treatment Slin modifications are minimum or absent, and

the cosmetic results are perfect
4. Treatment prolonged over more than 6
weeks gives an appreciable palhative result,
especially in a very advanced case, with the
patient in poor general condition, but steriliza
tion of the tumor is rarely accomplished and
is usually followed by recurrence However,
recurrence is very slow in contrast to the rapid
development of the tumor before treatment

Clinical control during treatment Daily observation and examination of patients are without doubt the most important factors in the conduct of treatment. It is only by closely following the patients that one can adapt the daily dose to the exigencies of the varying local and general conditions, rarely does a patient benefit from routine treatment. Individual peculiarities as to ocular, skin, and cutaneous reactions are among the factors which demand the daily careful examination of the patient.

Total dose The total dose administered





Figs 8 and 9 Case 7 Epithelioma of the suprastructure of the maxilla, external form Roentgentherapy in 42 days Conservation of vision A to trace of irradiation on skin Cure of 5 years' duration At left, 1932, at right, 1937

varies with the period of time covered in the treatment. A dose of 4,000 r—measured on the salm—given in 14 days through two fields on the same side of the face, causes at times great suffering both local and general, but a dose of double that magnitude, 8000 r given under the same conditions but over a period of 87 days, as in one of our patients, was insufficient to sterilize the neoplasm, but caused no local or general accidents

For a treatment extending over 5 or 6 weeks, the total effective dose seems to vary between 6000 and 7000 r administered through two fields on the same side of the face. These doses closely approach the limits of danger

Daily dose Almost all of our patients have received continuous treatment, daily or twice daily, the average dose has thus varied, depending on the prolongation of the treatment, between the extreme limits of 130 to 700 r per day

In a continuous treatment, extending over 5 to 6 weeks, the average daily dose is 200 to 250 r, but this dose must not and cannot be systematically applied day by day. It represents only an average of the total treatment. The daily dose must pass from maximum to

minimum, depending upon the effect of the irradiation

Reactions Beginning with the first days of treatment the external portions of the tumor are covered with false membranes—an indication of the characteristic sensitiveness of this type of tumor Even with low daily doses these false membranes often persist until the total disappearance of the neoplasm

If the treatments given are of moderate or high dosage, there appears between the twelfth and fitteenth days a reaction of the normal mucosa, a mucosal radio-epithelius involving the mucosa of the gingivobuccal sulcus and extending finally to the palate and upper lip. If at this time the treatment is stopped or the daily dose is lowered, the mucous reaction disappears after 7 to 10 days. However, if the high dosage treatment is continued, the condition tends to persist

At the end of the fourth week the epidermis, which has become very red over the cheek, is denuded, a radio-epidermits isproduced which is usually exudative in type, due to the two superimposed fields on the antero-external part of the cheek. Complete healing takes place in 8 to 10 days. In extended treatments



Fig. 10 Case 6 Epithelioma of the infrastructure of the maxilla and submaxillary and carotid adenopathy. Treated by roentgentherapy in 43 days. Palstine perforation closed to trace of irradiation on skin. Circ of 6 years duration.

the radio epidermitis results at times in only

dry desquamation

The lids and conjunctive also react, becoming edematous and congested, with epila-

tion of the lids. Care must be used in such cases to avoid infectious complications.

STUDY OF RESULTS

The radiosensitivity of epitheliomas of the maxillary sinus is generally great, about equal to that of the lympho epitheliomas

Five of our 10 patients had very extensive tumors and none of these has survived (Table 1). Two of these patients died 2 or 3 necks after treatments of short duration which brought a general weakened condition. Two others died, one 6 months and the other 18 months after treatment, with recurrence complicated by necross of the mazilla. Finally, the last patient died 18 months after treatment extending over almost 3 months, followed by gradual recurrence.

The 5 other patients had lessons more or less localized in the suprastructure or infra structure of the marilla Four of these patients remain cured, the longest period being 15 and the shortest 5 years. Two of these tumors were of the infrastructure one, Case 10, after treatment and local healing, developed submanillary adenopathy of rapid evolution and the patient died 6 months after.

TABLE I -SUMMARY OF LATIENTS TREATED

Case	Serie	Sear	Sex	S de	Clinical condition	Hs tology	Duration treatment	Results
1	IX 4 o	10 0	F 74	R	\cry extensive \c	Non-eş iderme d epithel oma	tą days	General cond tion enfeebled. Died to days after treat ment of cardiac complications
,	IX 4 5	110	\f \$3	L	Suprastructure \n adennpathy	Ep dermo d epitheljoma	az daya	Lu a of eye Lute radionecrosis of skin. Cure of 13 years furation
3	IX 4 As	928	\I 42	L	Very extens ve No adenopathy	Ep dermo d epitheli ma	ZS days	Early necroses of inferior manila of de tal one n Re- currence and necroses of superior manila. Died at months after tr atment
4	IX 4 09	930	F 62	L	Supra Tructure to adenopathy	Ep dermoid epithel oma	18 days	Loss of thion 2 years after treatment. Cure of years die alies
5	IX A a	1030	11	R	Very exten ne Vo	Épidermo d ep thelioma	z6 daya	General condition colcebled. Died 3 weeks after treatment
6	IX 4 73	1931	36 M	L	Infra. tructure Sub- manifary and cer vical adenopathy	Epidermo d ep theisoma	48 d)s	No trace of arradiation on skin. Cure of 6 years two-
7	IX 1 s	1932	VI Sb	L	S prastructure. 1re- uncular gi ad	Eş idermoid eş ithelioma	42 days	to trace of stradiation on skin. Cure of 5 years turb
8	IX 4 6	1932	}0	L	Very exten me No adenopathy	Epiderm id epithelioma	87 days	Gradual recurrence 3 months after treatment. Second arradiat nn with non-ternizati n and necrosis. Died 25 months after treatment
9	IX A 78	1933	VI SB	L	Very exten ne Car tid gland	o ep dermoid ep th h ma	42 days	Non sterulization with necrosis. Ded 5 months after treatment
10	1X A 79	1934	1/	R	Infrastructure Sub- manillary gland	Egadermoid epithelioma	57 day s	Subseque t development of adecopathy P to t did not return for treatment. Died 6 months after initial

treatment, the other, Case 6, was an extensive lesion with cervical and submaxillary adenopathy and the patient is now cured after 7 years of observation, the communicating orifice between the sinus and buccal cavity having closed spontaneously, the cosmetic result is perfect (Fig. 10). The 3 other cases were tumors localized in the suprastructure. They are all cured, but the cosmetic result is varied, as was noted in the discussion of prolongation of treatment. One patient, Case 2, was treated for 12 days, he developed a corneal ulcer and lost the eye after treatment, 1 year later he

developed late radionecrosis of the skin which required 4 years to heal. The cosmetic result is not enviable (Fig. 5). The second patient, Case 4, treated for 18 days, did not lose the eye but the vision diminished to the point of complete loss 2 years after treatment, the skin bears traces of irradiation (Fig. 7). Finally a third patient, Case 7, was treated for 42 days, which permitted adequate ocular protection, he remains cured and has almost perfect vision in the eye of the affected side after 5 years, the skin shows no trace of irradiation (Fig. 9).

CYSTIC CHANGES IN THE ENDOMETRIUM

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THE term "cystic glandular hyperplasia of the endometrium" has come into use since the publication of studies by Schroeder Numerous authors have contributed articles on this subsect. The condition is presumed to occur as a result of a lack of function of the corpus luteum or because of the unopposed action of estrin on the endometrium in the presence of this failure or deficiency of the corpus luteum It has been said that this condition of the endometrium is frequently associated with the presence of follicular cysts of the ovaries Shaw affirmed that these cysts are an almost invariable accompaniment of the condition of cystic glandular hyperplasia Burch and his coworkers said that if progestational changes, those due to the hormone of the corpus luteum progestin, are present on micro scopic examination of the endometrium one is not dealing with endometrial hyperplasia. The imal accuracy of this statement must naturally be based on a combined study of the endome trium and the ovaries Such studies have been made by Shaw and others, and in each series there have occurred instances in which corpora lutea were found. These have been considered to be either immature or old and non functioning

The statement is often made that this so called endometrial hyperplasia occurs because of ovarian failure. The terms "ovarian fail ure" and "ovarian deficiency," often are loosely employed. It is generally agreed that when primary ovarian failure begins the functions of ovulation and formation of corpus luteum are the first to fail. As a result of this failure, production of estrin and the effect of estrin on the endometrium may proceed without the usual inhibition that is imposed by the function of the hormone of the corpus luteum. In this instance one cannot say that failure of the ovary as a whole has occurred for the pro-

From the Section on Ob tetrics and Gynecology and the Division of Medicine. The Mayo Clinic

duction of estrin persists and actually may be increased Such a condition as this may exist for years without the usual manifestations of pituitars hyperfunction that follow failure of production of sufficient estrip to cause normal cyclic pituitary inhibition The term "ovarian failure" should be qualified The present state of our knowledge of the disturbances of the physiology of the female genital tract would seem to justify such qualification. In cases in which the term "cystic glandular hyperplasia" has been applied to the condition of the endometrium, one might speafy failure or deficiency of corpus luteum function as the case might be In these cases there is microscopic evidence that failure of the pro duction of estrin and its effect on the endometrum has not occurred. There exists a stage of persistent proliferation as a result of lack of the effect of progestin Herrell and Broders previously have shown the value of a histologic study and classification of endo metrial tissue arrested in its process of re generation because of a deficiency in the stim

uli which control this process The microscopic pictures of the cyclic changes that occur in the endometrium in re sponse to the normal ovarian stimulation are recognized generally The terminology applied to the various phases in this cycle is not universally the same We believe that the effect of estrin on the endometrium is best de noted by the term "prohferation" and the effect of the hormone of the corpus luteum is hest denoted by the term "differentiation" These terms seem best to describe the proc esses that are evident from microscopic study of the sequence of events that occur in the normal development of the endometnum Other terms which have been given to the endometrum that show the effect of stimula tion by progestin are "secretory," ' pregravid' or "progestational" These terms do not seem to correspond in a descriptive sense with the term "proliferative endometrium" that is

commonly applied to the histological picture during the estrogenic stimulation in the first half of the normal menstrual cycle The terms that are applied to the histological picture of the endometrium when the normal sequence of the effects of estrin and progestin have been interfered with are admitted by many writers to be inadequate and not entirely satisfactory Thus the fully developed picture of the endometrium reterred to as 'cystic glandular hyperplasia" represents complete failure of the function of the hormone of the corpus luteum, prohably tor a considerable time and to a considerable degree The microscopic evidence of persistent proliteration or so called hyperplasia varies greatly in specimens of this type of endometrium. This variation probably depends on the amount and duration of stimulation from an unopposed effect of estrin There is microscopic evidence that intermediate stages of corpus luteum failure exist in which evidence of differentiation of the endometrium, due to the action of the hormone of the corpus luteum, is incomplete. The history or spontaneous remussions of atypical bleeding and epontaneous recurrence, which is not uncommon among patients who have these degrees of hormonal deficiency, suggests that this is true. The varied symptoms, such as atypical bleeding, amenorrhea, and the occurrence of cystic endometrium among women who have normal menstrual periods, further suggest that there are degrees of loss of function of corpus luteum which may eventually lead to a persistent proliferative phase of the endometrium with cystic degeneration (cystic glandular hyperplasia)

Microscopic examination has been made of 278 specimens previously described (3) In 28 of these specimens cystic changes were found. The endometriums in which the cystic changes occurred represented all phases of the endometrial cycle, early and late proliferative and early and late differentiative, including the earliest evidence of stimulation with estrin and the complete differentiation which results from the action of progestin. In the 28 cases in which cystic changes were present in the endometrium, the phases of the menstrual cycle were as follows: early proliferative phase in 5 cases, late proliferative phase in 8 cases,

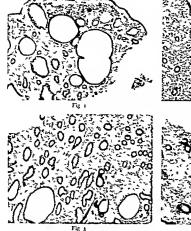
early differentiative phase in 9 cases, and late differentiative phase in 6 cases

In the 5 cases in which the endometrium was in the early proliferative phase, the specimens were removed 17, 22, 59, 90, and 199 days, respectively, after the first of the preceding uterine bleeding. None of the patients in these 5 cases gave a history of normal menstruation, 2 had a bleeding dysfunction (menorrhagia and metrorrhagia), 2 had irregular scanty penods and r had had amenorrhea for more than 6 months. Two patients in this group complained of inability to become pregnant. Two patients gave a history of removal of a cystic ovary prior to their visit to the climic. None gave evidence of cystic ovaries at the time of examination.

The specimens of endometrium which were in the late proliferative phase of the menstrual cycle were removed on the 17th, 18th, 18th, 20th, 20th, 21st, 22nd, and 23rd day, respectively, after the first day of the last utenne bleeding Four of the patients in these 8 cases gave a history of normal menstruation, 4 gave a history of menorrhagia and metrorrhagia, 5 complained of stenlity, I had had a cystic ovary removed prior to her visit to the clinic, and the remaining ovary measured 3 by 5 centimeters at the time of her examination at the clinic. In 3 of these cases the basal metabolic rates were lower than normal in 2 cases the basal metabolic rate was - 17, in the other case it was - 15 The menstrual histories were normal in these 3 cases

In the 9 cases in which the endometrium was in the early differentiative phase of the menstrual cycle, 4 patients gave a history of a normal menstruation and 3 gave a history of hleeding dysfunction. Seven complained of sternity. Three had ovarian cysts at the time of examination and 1 had had a cystic ovary removed prior to her visit to the clinic.

In 4 of the cases in which the endometrium was in the late differentiative phase of the menstrual cycle the menstrual history was normal and in 2 cases the menstrual flow was scant in amount but the interval between penods was 28 days. Two patients in this group were found to have cyclic overses. None of the patients in this group had bleeding dysfunction and all complianed of sterlity.



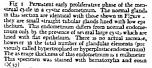


Fig. 2. Early probleratus phase of the menstrual cycle in normal endometrium. This pecianes was obtained on the ulth day of the normal menstrual cycle. The plands are lined with low plandleratus epithelium. The average are lined with low probleratus epithelium. The average the property of the problem of t

REPORT OF CASES

CASE 1 A woman, aged 50 years, came to the climic because of menorrhagia and metrorrhagia. The first menstrual period had occurred when she was 14

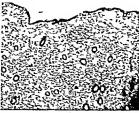




Fig. 3. Perustent late proliferative phase of the mestinal cycle in a cycle endometrum. The average thickness of this endometrum is approximately a minimum phase of this cycle in a normal endometrum is approximately a minimum phase of this cycle in a normal endometrum that the state of the cycle in a normal endometrum that the state of the cycle is a normal endometrum that the state of the cycle is a cycle in the cycle in the cycle is a cycle in the cycle in the cycle is a cycle in the cycle in the cycle in the cycle in the cycle in the cycle is a cycle in the cycle in t

vears of age. The interval had been as days and the duration had been 7 days until the z vear beast she came to the clinic. Since that time the in eral had varied from z to 6 weeks and the measural now

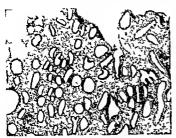


Fig. 5, left. Persistent early differentiative phase of the meastrail eycle in a cysite endometrum. The longitudinal clands in this specimen are characteristic of the early differentiative phase. The glands are lined with columnar epithelium, and the glands also show convolutions which are normal (Fig. 6) for the early differentiative phase, that is, the 15th of arst day of the cycle. The average number of longitudinal glands per low power field is 6 to 7. The endometrium shown differs from the normal only by the presence of cysite areas lined by a lat non functioning epithe lum. Some effect of the corpus luteum hormone is shown in the endometrium. However the absence of complete differentiation in the presence of cysis is indicative of par

tial failure Specimen was stained with hematoxylin and eosin (X37)

Fig. 6 Larly differentiative phase of the menstrual cycle in a normal endometrium. The specimen was obtained for hippsy on the 15th day of a normal menstrual cycle. This endometrium shows hegining differentiation. There are convolutions of the longitudinal glands and a transition to a columnar or differentiative type of cell. The endometrium is approximately a 5 to 3 millimeters thick. The average number of longitudinal glands per low power held is 6 to 7. These are evidences of a beginning effect of the corpus futeum hormone. Specimen was stained with hematoxylin and cosin (X37)

had lasted from z to 3 weeks In addition, slight spotting had been noted on several occasions. Twice in the 0 months preceding her visit to the clinic the menstrual flow had lasted for nearly 4 weeks. Dilatation and curettage had heen performed 1 year be fore we saw her at the clinic, but no evidence of malignant change had been found by microscopic examination. The basal metabolic rate was o Biopsy of the endometrium, which was performed 22 days after the first day of the last uterine bleeding, revealed a cystic endometrium which was in an early proliferative phase of the menstrual cycle. The tis sue is shown in Figure 1 and the normal appearance of early proliferation is shown in Figure 2.

Case 2 A woman, aged 27 years, came to the clinic hecause of irregular and prolonged menstrual She was not married The first menstrual period had occurred when she was 13 years of age There always had been a great variation in interval hetween the menses The menstruation al ways had been very profuse Dilatation and curettage had been performed 3 times but this bad not produced any relief General physical examination and pelvic examination did not reveal any ahnormality The basal metaholic rate was -7 The estrin content of the urine on the 23rd day of a 25 day men strual cycle was 11 rat units per liter of unne A test for normal amounts of prolan in the urine gave negative results on the 24th day of the same cycle Biopsy of the endometrium was performed on the 23rd day of a 25 day menstrual cycle Vicroscopic exam

ination of the tissue revealed a persistent late proliferative phase of the endometrium which was assocated with cystic changes. This tissue is shown in Figure 3 and the normal appearance of the late proliferative phase of the menstrual cycle is shown in Figure 4.

CASE 3 A woman, aged 23 years, came to the clinic because of primary infertility. She had been marned 4 years The menses, which first bad occurred at the age of 13 years, always had been irregul lar and prolonged. The amount of menstrual flow per day bad, however, not been excessive Examination revealed that the left ovary was about 4 by 5 centimeters in size The hasal metaholic rate was +4 The estrin content in the urine on the 30th day of the menstrual cycle was 40 rat units per liter An estimation of the amount of prolan in the urine on the 31st day following the last menstrual period failed to reveal any evidence of this hormone in the Transuterine insufflation of the fallopian tubes was performed and the kymographic tracing showed a maximal pressure of 170 millimeters of mercury and a minimal pressure of 120 millimeters of mercury The uterine cramp which was produced hy this procedure and the high pressure necessary to force gas through the fallopian tubes suggested the possibility of muscular resistance Biopsy of the endometrium was done on the 32nd day of a 34 day menstrual cycle Microscopic examination of the tissue which was removed revealed an endometrium in the persistent early differentiative phase of the

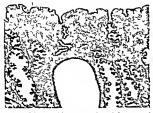


Fig 7 left Late differentiative phase of the meastrual scyle in a systic endometrum This specimen shows complete differentiation. There are 0 to 1 longitudinal glands to the loss power field but differentiation is complete. The abnormal leature of this endometrum is the presence of systic areas existing in an endometrum which bindougrally cystic areas existing in an endometrum which bindougrally lateum. Specimen was stained with hematory lin and cosin (X31)

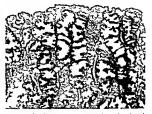
Fig 8 Late differentiative phase of the menstrual cycle cycle and cystic changes. This tissue is shown in Figure 5 and the normal early differentiative phase

of the menstrual cycle is shown in Figure 6 CASE 4 A woman, aged 26 years came to the clinic hecause of primary infertility. She had been married 3 years. The menses first had appeared when she was 15 years of age. The interval be tween the menstrual periods always had been 28 days and the duration had been 4 to 5 days. For several months before the patient came to the clinic there had been some decrease in the amount of men strual flow Examination revealed that the right ovary was about a times the normal size. The basal metabolic rate was -4 On the 26th day of the men strual cycle the estrin content of the urine was found to be 10 rat units per liter. The amount is within normal limits for this phase of the menstrual cycle The urine was tested for an excessive amount of pro lan on the 27th day of the menstrual cycle but the result was negative. Transuterine insuffiction of the fallopian tubes revealed a normal Lymographic tracing and a maximal pressure of 65 millimeters of mer cury Biopsy of the endometrium was performed on the 26th day of a 28 day menstrual cycle. The tissue was found to be of a late differentiative phase of the menstrual cycle and cystic changes were noted. This tissue is shown in Figure 7 and the normal differen tiative phase of the menstrual cycle is shown in

COMMENT

Figure 8

Microscopic examination of 28 specimens of endometrium revealed that cystic changes occurred in all phases of the menstrual cycle



no a normal endometrum. Specimen obtained on the 13th day of a normal mentatual cycle. The average number of longitudinal glands remains 6 to 7 per los power held. The flands are tussied on the longitudinal axis giving in cross-section a sea shell appearance. The epitichium innig the flands is fully differentiated. This ident is the to complete action of the hormone of the corpus luteum on the endometrum. The endometrum is approximately 4 mills meters that. Specimen was stained with hematoxylin and cosin (×32).

In those endometriums in which cystic changes occur in the proliferative phase there is often an accompanying proliferation, so called hyperplasia, of a greater degree than occurs normally Thus, a polypoid endometrium is usually increased in thickness, al though the microscopic picture of the probler ation remains the same As the differentiative phase appears and increases, this proliferation is less and less noticeable but the cystic changes persist These microscopic indings seem to correlate with the clinical history Atypical bleeding was not present in any case in which a well differentiated endometrium was associated with cystic changes Those tissues in which cystic changes were found in the early differentiative phase were not in frequently associated with atypical utenne bleeding In cases in which a cystic endome trium was in the late proliferative phase of the menstrual cycle, atypical hleeding was more frequently present The essential difference in these specimens of the endometrium is the de gree of differentiation which must exist be cause of a difference in the activity of the hor mone of the corpus luteum It has been said that the function of the corpus luteum is on an all or none basis There is microscopic evi

dence to the contrary Cystic changes are very common in the endometriums of wonien at the beginning of the menopause, when the first phase of ovarian failure is commencing Ovarian failure is essentially the same among younger women and should be accompanied by the same microscopic appearance of the endometrium. The corpus luteum is a gland of internal secretion. No other of the so called endocrine glands has an all or none reaction so far as function is concerned. An all or none response is certainly not true of the graafian follicle because all degrees of proliferation can be observed microscopically.

SUMMARY

Microscopic study of 278 specimens of endometrium removed with a biopsy curette revealed that in 28 of these specimens cystic changes had occurred These tissues represented all phases of the menstrual cycle from the early proliferative phase to the late differentiation. This cystic change is believed to be the result of failure or deficiency of the function of the corpus luteum. The amount of proliferation is dependent on how complete or persistent this failure or deficiency has been

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PATHOGENESIS OF ANAL FISSURE AND IMPLICATIONS AS TO TREATMENT

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N anal fissure is a lesion of compara tively minor pathological import But from the clinical point of view. its frequency, its common misdiag nosis, its often inadequate management, with the resultant sum total of extreme discom fort and incessant nagging pain—all combine to make it one of the roost important anal lesions. To this every proctologist will attest To him the typical history of neglect, or ineffectual treatment over weeks and months —of outments and applications of every kind and description, of brutal dilatations and of various injections and surgery-is a matter of almost daily experience. And the physician who mally secures relief for the patient is indeed the recipient of the latter's genuine gratitude

Heretofore there has been no fully adequate nor complete statement of pathogenesis con cerning this common lesion. There has resulted, as always under such circumstances a habel of therapeutic suggestions with assur ance granted to none that his efforts at cure were along logical and scientific principles Apparently divergent methods of treatment, presupposing also divergent concepts of patho genesis or even without any such concept, have occasioned equally satisfactory reports and as positive denunciation Yearly all procedures have on analysis combined a variety of elements, and no one, by a sound basis of pathogenesis could say which were the effective and which the mert components The pragmatic test of cure has been mislead ing both hecause of these multiple elements and also because of glaring mistakes in criteria of cure

We wish here to present for the first time a completely adequate conception of pathogenesis which fits in with all the known facts at our disposal which explains the favorable impressions of apparently divergent methods of treatment and crystallizes what has been the common active element, the recognition of which alone can insure more intelligent treatment. We wish to point out also the roentioned mistakes in criteria of cure, not heretofore discussed.

First, however, a passing word as to diag noses All patients with this lesion complain of acute and real anal pain, a history of a few days of such pain is commonly caused by only 3 lesions, viz, acute thrombo-ed hemor rhoids, acute abscesses, and anal nasures Differential diagnosis usually involves then only these 3 conditions whenever a patient presents himself with acute anal pain symptoms have continued somewhat longer (and this is more commonly the case), part the time when an abscess would have reptured, and visual examination reveals no thrombosed hemorrhoids, one can be almost sure that an anal poure is present. And let no one with any sympathy for human suffering undertake exhaustive corroborative examina tion without at least surface anesthesia!

A good start had been achieved toward a firm pathological basis on which to huild a rational therapeutic structure with the obser vation that these assures are for the most put found directly posterior in the anal canal, occasionally directly antenor, and only very uncommonly elsewhere around the circum ference It was logical to assume, theretore, that whatever peculiar factor of any nature, anatomical or pathological, or both, could be found commonly posteriorly and to a lesextent anteriorly, would provide a satisfactory point of departure Such a factor was to and in the 1 shaped divergence of certain of the external sphincter tibers in their course to attach to the coccyx, and, to a less extent antenorly

And it should be emphasized, on the other hand, that all pathological lesions such a crypts, hemorrhoids, hypertrophied papiller, and vancosities, which theoretically might

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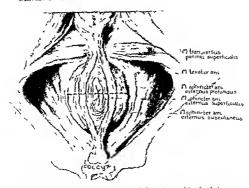


Fig. 1 Sphincler muscles of the anus from below. Vertical levels of the various parts are shown in Figure 2. The transverse dotted line is for the purpose of identifying section represented by models. Notice that the subcutaneous and deep portions of the external sphincler are arranged in a circle, while only the Superical portion diverges to anterior and posterior attachments. (Mer Minigan and Norgem in The Lancet)

eause fissures, are very noticeably inconspicuous directly in the posterior and anterior commissures It is well known that these pathological entities occur most constantly and invariably at 5, 7, and 11 (referring to the face of a clock) and not at 6 and 12 where fissures occur If fissures are caused by underlying hemorrhoids and varicosities, why are the former rarely found where the latter are constantly situated! Or if, as is also commonly stated, a fissure is the result of a torn crypt, why are not other crypts, commonly found elsewhere around the circumference, also torn. If that be the complete explanation, why are they found torn just anteriorly and posteriorly! No, these explanations are simply madequate. It is not denied that these other lesions have bearing, and no treatment for fissure should be considered adequate which does not include appropriate treatment for them, but their role is not major

It is to the peculiar anatomical features, then, rather than to possible concomitant pathological entities, that we must logically turn for further consideration as regards the pathogenesis of anal fissures The explanation by the Y arrangement of the muscle fibers was put forward by Lockhart-Mummery, as quoted by Gabnel, and is a commonly accepted one, the overlying tissues being assertedly least supported at the commissures by such arrangement. But no treatment ever suggested has attempted to correct this underlying cause if such it be, or achieved such correction, an obviously illogical state of affairs!

One important fact was, and has been, overlooked, in connection with this explanation, and this failure led to loss of the scent and to the pathological groping and resultant divergent therapeutic opinion Such explanation would inevitably presuppose the resultant fissure to occur directly between the crotches of the Y, as shown by the circle in Figures 2, 4, and 5 If one will examine these cases with this point particularly in mind, disturbing tissue relations as little as possible by means of utmost gentleness, he will find that these fissures do not occur above the anal intermuscular septum on the tissues overlying the crotch but further caudad, as shown by the square in the same figures, on the surface of

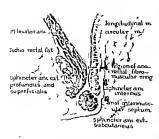


Fig 2 Vertical section of anal canal Notice that the subcutaneous portion of the enternal sphiniter is on the same vertical plane with the internal sphiniter is separated from it by the anal interfunicular septim a landmark, readily identified in the living by palpation the deep and superficial portions of the enternal sphiniter on the other hand surround the internal sphiniter on the other hand surround the internal sphiniter enclosing and supporting it Black circle and square have been added and ane explained in text (Mer Villigan and Worgan in The Lance)

the subcutaneous portion of the external sphincter, the fibers of which do not attach to the coccyx, but run circularly all the way around the anus These fissures occur so near the outlet that they may usually be seen with but very slight, indeed sometimes with out any, parting of the anal folds or outward sliding of the skin Such would not be the case if the fissures occurred higher up on the surface of the internal sphincter which over lies the crotch of the superficial portion of the external sphincter (Fig. 4) Examination under anesthesia reveals that the relation of the fissure to the anal intermuscular septum and subcutaneous portion of the external sphincter can be corroborated by palpation with the finger, for these latter are easily recognizable landmarks

And yet we believe it impossible to get away from the fact of the V shaped diverging fibers as an etiological factor. For further consideration as also for full appreciation of the discussion to this point, a detailed knowledge of anal anatomy is essential. The recent



Fig. 3. Model of the sphincter muscles of the saw, representings section below dotted into it liquits: I Lexitor and muscle is not included. Model represents muscles in district state: 4 lower border of internal planeter. 4 small piece of the subcutaneous portion of the external that portion and the internal sphincter are not the same vertical plane. B, superficial portion of the external sphincter with the engine sheer. E attacking to eccyp. C deep portion of external sphincter composed entirely of circular shorts. D subcutaneous portion of external sphincter consisting entirely of circular shorts which do not superficial and deep portions but is on the same vertical plane with it and separated from it by the anal intermuscular septime.

paper of Milligan and Morgan is the best practical exposition on this subject of which we know and in our opinion should be ther oughly mastered by all who perform rectal surgery It is only possible to point out within the limits of this paper that the exter nal sphincter is in reality composed of 3 distinct portions, viz, the deep, the super ficial, and the subcutaneous portions (all figures) The deep and superficial portions surround the internal sphincter (which is but the slightly thickened termination of the cir cular coat of the bowel) like a band, the deep portion merging at its upper border with the The deep and subcutaneous levator ani portions are composed of circular fibers only, while only the superficial portion has I' shaped fibers posteriorly (and to a less extent ante morly), with attachment to the coccyx Also to be especially noted is that the subcutaneous portion does not enclose the internal sphincter, as do the other portions, but is caudad to it, on the same longitudinal plane with it, and

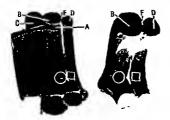


Fig. 4. On left is model shown in Figure 3, looking down on it from showe. On right are just segments of the sub cutaneous and superficial portions of the external sphincter in same relative position, showing diverging fibers of latter. If these diverging fibers were the sole cause of fissure the latter would be attained as represented by the curcle, which occupies the same relative position in both models. Fissures do not occur here, however, but are found rather at position marked by the square. Letters represent the same structures as have been described in Figure 3.



by 3. Same model as Figure 3, representing here a view of the anal canal looking from within out, with muscles in diated state. The formation of a posterior bar (and to a less extent an anterior bar) by the comparatively weak and comparatively unsupported subeutaneous portion of the external sphinter is planily shown, and reveals the necessity of including the severance of this bar as a part of the procedure in the treatment of anal fissure. The let ters represent the same structures as have been described in Figure 3.

separated from it by the anal intermuscular septum

Now then, why are fissures found on the surface of the subcutaneous portion? The explanation is found on viewing our models illustrated, and from them hypothecating the behavior of the component elements on dilatation of the anus as during the passage of feces The situation is shown in Figure 3 The bowel wall including the internal sphineter is well supported at the upper limit of the anal canal by the surrounding deep portion of the external sphincter, strongly supported in turn by the levator ani, further down it is well supported by the surrounding superficial portion of the external sphincter, together, the internal sphincter and surrounding superficial portion of the external sphincter, together with intervening tissue, form a strong support, and posteriorly the elements inside the crotch of the external spluncter follow the shape of the latter as shown The subcutaneous portion of the external sphincter. now, besides being the smallest of the 3 components of the external sphincter, stands by itself, as can be seen, unaugmented by internal sphincter and other elements within, and with no attachments to the coccyx posteriorly It must therefore swing across the crotch as shown—the weakest part of the whole anal ring

Now let us view the situation from within the rectum, looking outward through the anal canal (Fig. 5). The relatively weak and unsupported subcutaneous external sphincter is plainly seen, stretched across like a bar. And both because of its comparative weakness and its uniquely exposed and unsupported position, it constitutes, together with its overlying mucous membrane, the most vulnerable point to injury, during defecation, of the whole anal canal

If one doubt the existence of this bar, let him examine the anus with this in mind. following the landmarks suggested by Milligan and Morgan He will feel plainly the anal intermuscular septum, and caudad to it the subcutaneous portion of the external sphincter-all the way around, but more plainly and distinguishably directly posterior, and particularly if the anal canal be put on stretch while withdrawing opposed examining fingers We have repeatedly asked mexpenenced internes assisting us in operating upon these patients to palpate the anal canal on the ball of the flexed forefinger, drawing it slowly from within out, and to compare sensations obtained in the commissures and lateral quadrants With no coaching or suggestions whatseever on our part the posterior subcutaneous bar heneath the fissure is invariably noted except in cases in which particularly profound relaxation is obtained by the anesthetic Even in these latter cases, with the assistance of an indefinite suggestion of such a bar as possibly being present in one of the quadrants, its presence is usually correctly deter mined posteriorly.

The implications as to treatment are obvious Severance of the muscle har to conform with the Y shape of the more cephalad superficial portion of the external sphineter must theoretically comprise the essential element of treatment, with a light pack of vaseline gauze laid in the wound in the direction of the and canal for several days to prevent healing of

the ends into the old position

The validity of these theoretical considerations has received practical proof in my own experience of several hundred cases We have used exclusively the wedge shaped resection of the ulcer described by Gabriel, with the broad base on the outside of the canal including healthy tissue. This base has been dis sected rather deeply, its greater width and depth thus affording opportunity for the wound to heal first on the inside At first the muscle was not severed and recurrence of the fissure was so common that we were thus led to the review and study of the situation with this communication as the result. Since severing of the muscle bar, recurrence has not been a factor, even with a much less radical dissection than advocated by Gabriel procedure is not recommended to those who are unable to recognize, at least approximately, the limits of the subcutaneous por tion of the external sphincter In all of our experience we have never had a single un toward result from severance of these fibers, but we do not share a commonly expressed confidence in the innocuousness of unlimited posterior proctotomy

Other proctologists of experience, such as Buile (5), for example, have expressed their conviction on the importance of severing muscle fibers, although no accurate descrip tion of just what amount should be severed is found Others have opposed this particular

step, while some have mentioned it as rather optional, for heretofore the procedure has been entirely empirical and there has been lacking the rational correlation of an adequate conception of pathogenesis with what was accomplished by severance of the muscle, such complete concept being necessary to make the position impregnable. For example, it had been held that such severance "put the muscles at rest" and thus gave chance for healing But wounds following hemorrhoidec tom, and other anal surgery do not require the muscles "being put at rest" to heal satis factorily, nor in the nature of things could the sphincter mechanism be put at rest without its complete severance, and resultant inconti nence It is small wonder that the importance of this element of procedure has failed of the universal recognition which this study demon strates to be deserved

Furthermore, we have already alluded to the possibility of fallacious criteria of cure as having been a factor in failure to achieve universally accepted treatment. In this connection we wish to point out that by resection of the fissure alone one can and does very frequently obtain symptomatic relief without actual healing of the fissure. This is because of effective miterruption of nerve fihers by the resection of itssue and its replacement by insensitive scar tissue. Indeed, several of our patients in the past, who failed to return for final examination as directed, since they felt so well, returned later with fistuals which had

originated in unhealed or recurrent fissures Another point to which I wish to call atten tion is that healing, even though corroborated by vision, is not a sufficient criterion of satis factory cure These fissures frequently heal without any treatment Indeed, a history of alternating periods of healing and recurrence is typical and characteristic. In other words the factor of recurrence and not of healing becomes the real criterion of successful man agement Permanent healing, corroborated by repeated isual examination, must constitute the only adequate criteria of the efficacy of any treatment of anal fissure It can readily be apprenated how failure to observe these criteria has, in the past, added considerably to confusion

Dilatation of the anus has been commonly advocated as treatment of anal fissure Repeated dilatations in combination with anesthetic oily solutions is a recent suggestion of Daniels. Here too, the explanation of "rest" has constituted the theoretical background A more logical explanation is a stretching, first, and most markedly, and thus obliteration of, the weak and prominent bar. There are valid arguments against the method

We should like to dwell at length on the many misconceptions which are encountered in the literature and are common in practice, but it would take us too far afield. They can in large measure he forgiven, hecause heretofore, as stated, no entirely adequate thesis of pathogenesis or criteria of cure has heen developed and universally accepted word, however, concerning a therapeutic measure which has attained extended credence but which fits in with no rational pathological hasis, viz, the injection of oily anesthetic solutions heneath the ulcer By the relief of pain, this is said to relieve spasm of the sphineter long enough to allow the fissure to heal

Now either the pain of the fissure maugurates the spasm of the muscle or else the spasm inaugurates the fissure True, it is possible to have some element of a vicious circle, but one or the other must be the primary and dominant factor If the fissure be first, and such is logical, then injection of the anesthetic will, by relief of pain, relieve the spasm-just as morphine relieves the rectus spasm of acute appendicitis But what theoretically conceivable pathological cause of the fissure could thereby be affected, any more than the appendix is removed by the morphine! If, on the other hand, the spasm of the muscle be the primary lesion and the cause of the fissure, then too, rehef will continue only until the anesthetic wears off, the pathological basis of the spasm remains

This paper is not intended to serve as a complete guide to the treatment of anal fissure At best, there is much in experience with these lesions which printed word can scarcely convey One learns, for example, how necessary is constant postoperative supervision of the wound to prevent bridging instead of healing from the hottom, how carelessness in this respect can in a few days entirely nullify one's most perfect operative efforts, how the base of the wound must be prevented from healing before the apex inside, that scar tissue and other pathological lesions must be removed, and that the edges of the wound must he carefully trimmed These details and others must forego expression here, for we wished at this time only to clarify by our observations if possible, and emphasize, more general principles

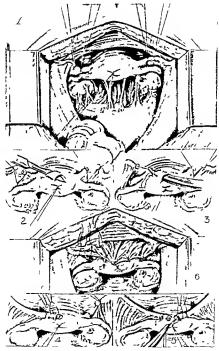
SUMMARY

Lack of an adequate concept of pathogenesis and errors in criteria of cure have retarded agreement on principles of treatment of anal fissure

Severance of an indefinite portion of the external sphincter has heen a disputed point in the treatment of anal fissure, and evidence submitted has been largely empirical. An adequate concept of pathogenesis is presented which lends firm support to the affirmative view, and accurately defines the portion of the sphincter to be severed.

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The Tunnel Method for Correction of Uterine Retrotersion - J Lyle Cameron

CLINICAL SURGERY

FROM THE GYNECOLOGICAL SERVICE, ROYAL WATERLOO HOSPITAL, LONDON

THE "TUNNEL" METHOD FOR CORRECTION OF UTERINE RETROVERSION

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ETROVERSION of the uterus necessitating some form of operative intervention for relief of symptoms is a very common condition and one often abdominal operations such as appendicectomy. It is, therefore, advantageous for the general surgeon to be familiar with a simple method of dealing with cases of retroversion, and one which can be depended upon to yield satisfactory results

The operation for correction of retroversion of the uterus about to be described is one which I have employed with uniform success for some

years

With slight modifications in technique the procedure is similar to that devised by Professor van Rooy of Amsterdam whose excellent work I have been privileged to witness

The indication for its employment is retroversion of the uterus associated with backache, dysmenorrhea, dyspareunia, pelvic pain, or a feeling of weight in the pelvis when the patient is standing or walking

Its special adiantages are that the fundus of the uterus is tilted forward without lifting the uterus out of the small pelvis which is its normal situation and where mechanical factors may be such as to assist the processes associated with conception Furthermore, as van Roos pointed out, the fallopian tubes are neither kinked nor bent as is usually the case when forward suspension of the uterus is effected by operations which entail shortening or tightening of the round ligaments. This bending of the fallopian tubes was thought by van Rooy to be a potent cause of the sternity which frequently follows these round ligament operations.

Contra indications to its use are acute or subacute salpingitis, and conditions which firmly fix the uterus in a retroverted position such as extensive inflammatory adhesions or occasionally dense fibrosis associated with endometriosis, especially when the follopian tubes or ovaries are irreparably damaged and sterility is inevitable. In such circumstances a firmer and stronger flaation of the uterus is imperative.

Procedure Preparation for abdominal operation is carried out in the usual manner. With the
patient in the Trendelenburg position a skin incision 4 to 5 inches long is made in the midline
below the umbificus and with the lower end
terminating about 1 inch above the pelvic brim.
The opening in the aponeurosis and parietal
pentoneum is carried well down to the upper
border of the symphysis pubis. The wound edges
being covered with mackintosh sbeeting and thin
towels, are separated with a self retaining re

Fig r The abdomen having been opened and the wound edges retracted, the uterus is drawn upward with a traction stitch through the fundus Thin strands and tenuous velk of fibrous adhesions are rendered taut and tenuous velk of fibrous adhesions are rendered taut and tenuous velk of wound the stranger asset partout each round ligament one ½ inch and one ½ inch from the side of the uterus.

Fig. 2. The round ly, aments on each side have been divided between the pairs of stitches and an oblique tunnel is now made with a small scalpel or a pair of pointed scisors through the musculature of the front of the uterine body.

Fig 3 A pair of forceps is passed through the tunnel supping the stitch on the distal portion of the round liga

ment which is to be drawn through the tunnel to the required distance

required distance

Fig. 4. The distal portion of the round ligament is
secured in the tunnel by two stitches the redundant

portion having heen removed.

Fig 5 The round ligament on the opposite side is drawn through the tunnel similar to that previously made and secured in place with stitches.

Fig 6 A fold of perstoneum along the line of its loader reflection from the front of the uterus on to the bladder has now been lifted up and stitched into place so as to cover the tunnels and all needle punctures in the front of the uterus \u2223 opening is left through which bowel or omentum may obtrude

tractor, and the towels and mackintosh sheets are then well drawn into the upper and lower angles of the incision. Intestine, omentum, and sigmoid colon are gently lifted up out of the pelvis and allowed to fall above the sacral promontory The abdominal cavity is excluded with a large soft turkish towel rung out of warm saline When careful exploration has been made, the condition of the pelvic organs has been ascertained and thin strands or tenuous veils of fibrous adhesions have been divided the uterus is drawn forward and upward with a traction stitch through the front of the fundus (Fig 1) Two stitches are passed around each round ligament one about 14 inch and the other about 1/2 inch from the uterus (Fig 1), the round ligament between each pair of stitches then being divided (Fig. 2) Any bleeding vessels are secured with clamps and ligatures or with small mattress strickes of fine catgut as the distal portion of each round hga ment is freed for about r inch (Fig 2) A tunnel about 11/2 inches long is now made through the musculature of the front of the corpus uten with a small scalpel or pair of pointed scissors (Fig. 2) The direction of the tunnel is estimated by pulling the uterus into the desired position and drawing the freed distal end of the fallopian tube into the situation which it will ultimately occupy The outer end of the tunnel is made medially to the uterine vessels and the inner end emerges on the front of the uterus about 1/4 inch lateral to the midline and about 1/2 inch below the highest point of the fundus. A pair of forceps is now passed through this tunnel, securing the stitch on the distal portion of the round ligament

which is drawn through the tunnel (Fig 3) and secured with two, or if found necessary three, in the contract of the contract o

This process is now repeated on the opposite side (Fig. 5)

Each round ligament is drawn through the corresponding tunnel sufficiently far to obtain the desired degree of forward version of the uterus, and the redundant portion is removed

Hemorrhage from needle punctures is arrested with fine mattress stitches of chromicized catgut on an eveless intestinal needle

The area in front of the uterus where the tunnels have been made and which has been perced by many stitches is now covered to prevent the possibility of bowel or omentum to coming adherent. A fold of the peritoneum along the line of its loose reflection from the front of the lower uterine segment on to the bladder is litted up and sutured to the front of the fundation uters with several interrupted catgut stitches (Fig. 6) which secure it in place and occlude any opening through which a coil of bowel or a tongue of omentum might obtrude. In securing this fold of peritoneum care must be taken to avoid puncturing the uterine vessels or piercing or bending the falloppian tubes.

When there is associated prolapse of the ovaries these may be suspended near the utenne cornua by pleating each ovario-uterine ligament

with a stitch of catgut

Clots are removed, the pelvis is dired with
gauze mops and the abdomen is closed in three
layers

RESECTION OF HEAD OF PANCREAS AND DUODENUM FOR CARCINOMA—PANCREATODUODENECTOMY

ALEXANDER BRUNSCHWIG, MD, FACS, Chicago, Illinois

ARTIAL or subtotal pancreatectomy has been performed for benign and malignant neoplasms and for hyperinsulmism (2) In a recent publication, Whipple, Parsons and Mullins (4) bave again shown the feasibility of removal of segments of duodenum and portions of the head of the pancreas for carcinoma of the ampulla of Vater or lower portions of the common bile duct. As far as the writer has been able to determine, wide resection of the head of the pancreas together with practically all of the duodenum for carcinoma of the head of the pancreas has not been recorded Such an operation was recently performed by the author and appears to be a feasible procedure. The history of the patient and details of operative technique are as follows

H P \o 166655 male, aged by years, was admitted to the medical service (Dr George F Dick) January 5, 1937 complaining of more or less constant pain in upper right quadrant of the abdomen radiating through to the back and to the left of 8 weeks' duration not aggravated by eating, increasing leterus and marked general pruntus of 7 weeks duration, and difficulty in utination, a years. There had not been an appreciable weight loss. Physical examination revealed a thin white male, markedly ictence A rounded indefinite mass was palpable in the region of the fundus of the gall bladder Temperature was normal The Wasser mann and Kahn reactions were negative, red blood count, 43 million, white blood count, 5 400, hemoglobin, 90 per cent Urinalysis revealed albumin, negative, sugar, nega tive bile, ++++, icteric index, 119, the stools were clay colored Roentgenographic examination of the chest and iluoroscopic examination of the esophagus and stomach were negative, questionable deformity of the duodenal bulb Cholecystograms were made but the gall bladder could not be visualized after oral administration of dve

Clinical diagnosis Carcinoma of the head of the pan creas with common duct obstruction

Operation—first stage, January 8, 1937 Spinal anesthesia was used with ethylene toward the end In view of the pre operative diagnosis it was planned to do a cholecystgastrostomy as a palliative procedure. The

abdomen was entered through a high midline incision. No excess free fluid was present Palpation in the region of the head of the pancreas revealed a very firm mass about 4 centimeters in diameter adherent to the adjacent inner wall of the descending portion of the duodenum Palpation and inspection of the liver showed no evidence of metas tases The gall bladder was markedly distended by hile its wall was thin and there were no stones Palpation and inspection of the peritoneal cavity and the viscera like-

From the Department of Surgery and the Division of Roent genology of the Department of Medicine of The University of Chicago

wase showed no evidence of metastases. A finger could be inserted into the foramen of Winslow Because the firm head of the pancreas was movable upon the underlying tissues it was decided to attempt resection of it by a two stage operation based upon the principles emphasized by

Whipple
At Dr Phemister's suggestion the following steps of the first stage were performed (1) "short loop" posterior gastro enterestomy with 2 rows of continuous linen sutures, (2) cholecystjejunostomy with interrupted silk sutures at a point approximately 12 inches below the above the loop of jejunum was brought through an opening made in the right portion of the transverse mesocolon, the martins of the rent heing sutured to the small bowel passing through it, (3) an entero enterostomy below the passage of the jejunal loop through the mesocolon. The several procedures are indicated in Figure 1 It was thus possible for bile to pass into the jejunum and the entero enterostomy permitted passage of inaterial down the jejunum from the stomach without circulating past the gall bladder. Fur thermore, the exposure for the second stage was facilitated hy not having the gall bladder anastomosed to the stomach over the region of the pancreas

Recovery from this operation was uneventful and patient was discharged January 27, 1937, for a rest period at home On February 5, 1937, he was readmitted The icterus had improved considerably, icteric index, 20 glucose tolerance test performed on February 8 showed starting blood sugar 140 milligrams per cent and 291 milli grams per cent after 3 hours, with +++ reduction of urine A second test performed a week after the second operation showed starvation blood sugar to be 107 milli grams per cent, 1/2 hour 183 milligrams per cent, 2 hours, 179 milligrams per cent and 3 hours 151 milligrams per cent brine was negative. There is no apparent explana tion for the high values obtained in the first test

Second stage was done February 11, 1937 ethylene anesthesia the abdomen was reopened through the old incision. The peritoneal surfaces appeared smooth and glistening but slightly fibrotic. There were no evidences of peritoneal metastases but the lower abdomen was not explored The liver appeared free from metastases on hoth inspection and palpation A curved incision was made through the pentoneum following the right lateral border of the descending portion of the duodenum and this loop with enclosed head of the pancreas was elevated to the left by gauze dissection This permitted satisfactory palpation of the lesson which did not appear to have increased appreciably in size since the first operation. It was also possible to ascertain that the growth had not apparently infiltrated into the retroperatoneal tissues

The stomach at the pylone sphincter was divided be tween two clamps and the first portion of the duodenum was retracted to the right. This exposed the midportion of the common bile duct which appeared to be about the size of a lead pencil It was divided between clamps and

the upper end doubly ligated with linen The neck of the pancreas was palpated and beneath it a

curved grooved director was carefully inserted from above downward and to the left, its tip emerging over the terminal

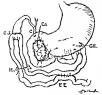






Fig t

Fig. r. First stage. Cu. Carcinoma in head of pancreas. C. common duct. C. J. cholecystojejunostomy. H. E. transvere mesocion through which loop of pipunum is passed for above anastomosis. G. E. short loop posterior gastronterostomy. E. E. enter-optierostomy. The figure is

diagrammatic in that the loop of jejinum employed for mactomous with the gall bladder is not as long as shown and the entero-enterostomy was performed a boost distance below the opening in the transverse mesocolon. Fig. 2 Second stage performed a month later. Inc. curved incision through posterior paretial personnel along convex border of ducdenum to permit mobilitation of head of paretess. Disigno of pylore sphinter. C.

portion of the duodenum (Fig. 2) The neck of the pan creas was then divided the scapel coming down upon the grooved director. When the parenchyma had been par tially severed several cubic centimeters of clear slightly viscous fluid escaped This was pancreatic secretion dammed up in the dilated pancreatic duct. When division of the neck of the pancreas was completed it was found that this had occurred just over the superior mesenteric vessels as they coursed downward over the terminal duo denum The head of the pancreas and adherent duodenum were then retracted downward and to the right and se moved after the latter was divided between clamps just beneath the superior mesenteric sein. The pyloric stump of the stomach was invaginated by 3 layers of interrupted linen sutures the duodenal stump by 2 layers of similar sutures The freshly cut surface of pancreas was ligated by 4 interrupted and interlocking linen mattress sutures the pancreatic duct was ligated separately. A large space previously occupied by duodenum and head of pancreas remained (Fig. 3) This was drained by a small soft rubber

tube and the midline incision closed
lathological study. The specimen consists of what appears to be practically the entire duodenum surrounding the head of the pancreas the latter consisting for the most part of a tirm mass that is inseparable from the adjacent duodenal wall In the fixed (formalin) state the duodenum measures 18 centimeters in length and the head of the pan creas 5 by 4 centimeters. The cut surface of the neck of the pancreas does not grossly exhibit tumor tissue. The pancreatic duct is identified but a probe cannot be passed through it into the duodenum. The severed common duct is identified and a probe passes readily into the duodenum The specimen is bisected as shown in the accompanying Figure 4 The plane of hisection does not include the plane of division of the neck of the pancress from the body The carcinoma which was not removed at operation arising in the head of the pancreas has extensively in

Ligated common duct Curved grooved director is passed beneath neck of pancreas and over superior mesentric vein V and 1 artery Neck of pancreas is transected over grooved director

Fig. 3 Termination of operation Excision of the bard of the paneress and doudcinum for carcinoma. The practically complete removal of doudcinum and head of paneress. The stometh and doudcinum and head of paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the paneress linguistic studies of the partial voice.

filtrated the duodenal wall producing at one point a small ulceration in the duodenal mucosa. The ampulla of vater is not involved in the growth Two small firm discrete hymph nodes are removed from the serosal surface of the

third part of the duodenum Microsoppe examination of a large section through the lesion and adjacent duodenal wall shows a dust cell earn mona composed of large columnar mailmant epithelial cells forming solid cords and tubules. These cell matter monache bundles Sections through the lymph modes show metastatic carcinoma. Sections through a fragment of pancreas removed from the line of resctions how scattered clumps of carcinoma cells. There is also marked should between clumps of alreid, indiuse round cell inditations.

and proliferation of small pancreatic ducts. Postoperative course Immediate recovery from the second stage was uneventful there being a minimal tem perature reaction and no nausea or vomiting. The small drain was removed on the fifth day. A small amount of clear serous drainage persisted from the drain site in the wound and on the fourteenth day it became distinctly biliary in appearance and increased in quantity A small Pezzer wound otherwise healed per primam catheter was inserted into the sinus and connected with a Il angensteen suction apparatus The daily fluid loss was tabulated and reached a maximum of 560 cubic centimeters on the forty fourth day after which it decreased rapidly in a few days to approximately 50 cubic centimeters a day and changed from a biliary character to a whitish mucoid discharge containing at intervals recognizable food parti cles This fluid was not found to contain active proteoly tic enzymes It was thought at first that the ligated common duct had reopened but the change in character of the drainage indicated it was an intestinal fistula Repeated attempts to cause the fistula to heal were made hy inser tion into it of kaolin and zinc oxide pastes but these pro-

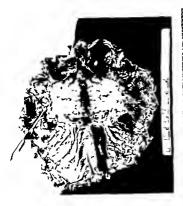


Fig 4 Surgical specimen showing excised duodenum and enclosed head of pancreas which contained a duct cell carcinoma that had extensively infiltrated the adjacent duodenal wall A probe has been passed through the ampulla of Vater, upward into the excised segment of com mon duct These structures were not grossly involved by neoplasm The plane of hisection of the specimen does not include the transected neck of the pancreas which did not grossly exhibit invasion by carcinoma

cedures did not entirely succeed although the fistula was reduced to shout 2 millimeters in diameter when the cathe ter was not in place. Because of difficulty in starting the stream, an inlying urethral catheter was inserted following the operation On the twentieth day a transurethral prostatic resection was performed by Dr C B Huggins of the Division of Urology following which practically normal urmation was possible

In spite of the complications noted the patient's condition remained generally fair A full diet was permitted after the twelfth day and although his lack of appetite for sufficient quantities necessitated frequent hypodermo clyses of 5 per cent glucose, adequate amounts of fluid were taken by mouth

lifter the third week the patient sat up in bed or got out of bed walked a little and sat up in a wheel chair for varying periods almost every day. The severe pruntus subsided and the icterus had disappeared by the end of the third week when the icteric index was r3 The stools were always light in color and pasty in consistency but contained bile This was due to absence of external pancreatic secretion. The urine tested at intervals, showed no reduction at any time

On April 26, 1937, the patient's condition suddenly appeared worse in that there was complete lack of any desire to eat, marked dizziness when he attempted to arise or sit up in bed and pronounced asthenia The blood pressure did not fall. The following day the sclera became

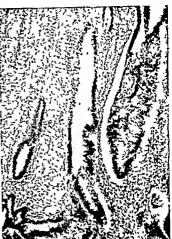


Fig 5 Photomicrograph showing growth of duct cell carcinoma of head of pancreas infiltrating duodenal wall × 80

rapidly yellow and hile appeared in the urine. There were no chills or rise in temperature On April 30, 1037, the patient went into come and died this being the eightyfifth day following the second stage of the operation Unoalysis was negative, blood chlorides 445 milligrams per cent and non protein nitrogen 4r, all taken a few hours

Summary of principal necropsy findings Carcinomatosis of the perstoneum with ascites (2000 cubic centimeters) Multiple large metastases throughout the liver, a small fistula leading from the inverted duodenal stump (of which section of bowel there remained about r 5 inches) to the midportion of the healed operative wound. The closed portion of common hile duct contained yellow mucoid ma terral The site of the duodenum and head of the pancreas contained inspissated material undoubtedly derived from the fistula on the one hand and as a result of injections of kaolin and zinc oxide pastes through the skin opening in endeavor to close the fistula However this space had he come much reduced in size as compared to its extent at the second stage of the operation and was well walled off from the general peritoneal cavity Sections of surrounding granu lation tissue showed numerous masses of carcinoma cells No peratonitis and no inflammation or ulceration in the stomach and intestines were noted. The anastomoses were healed and functioning Sections of the liver showed moderate polynuclear and round cell infiltration about the small hepatic ducts and scattered small abscesses in the parenchyma. The liver cells exhibited no marked changes in the routine sections nor in the sections stained by scharlach R. No terminal pneumonia was present.

The cause of death was widespread and rapid development of secondary growths in the form of perioneal carci nomatosis extensive hepatic metastases and the latter, as well as perhaps the choles place intensive by contributing to a diffuse cholanguits. The survival period of almost 3 disturbances due to the nature of the operation conditions of the contribution of the contribution of the contribution of the feathful of this type of operation in cleaning with malignant neophans such as described above.

Total extirpation of the duodenum was for a time thought by physiologists to be incompatible with life This impression together with the relative infrequency of operable tumors of the duodenum or head of pancreas, and the feeling that total extirpation of the head of the pancreas and duodenum was technically very difficult, no doubt contributed to the general lack of interest on the part of surgeons in these types of operations However, as long ago as 1918 Lester R Dragstedt and associates first demonstrated that in the dog the duodenum was not indispensable to life and that this segment of bowel did not have special internal or external secretions necessary for the function of the intestines lower down as was held at that time by some investi gators

SLMMARY

A case history is presented to show the feasi hilty of excision of the entire head of the pair creas and practically all of the duodenum for car cinoma of the head of the pancreas. Such an operation might also he performed for primari malignant tumors of the duodenum.

While no gross evidence of metastases was present at the time of the operations, the patient died \$5 days following excision and, at necropsy carcinomatosis of the peritoneal cavity and multiple line metastases were found forse and histological examination of the liver stomach, and bistological examination of the liver stomach, and of practically the entire duodenium had resulted in significant metabolic disturbances during the patient's survival period.

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THE TREATMENT OF ACUTE EMPYEMA

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N the treatment of any type of empyema the two main factors that must be considered are disinfection of the pleural cavity and reexpansion of the lung The first of these is accomplished by properly placed drainage and irrigation, the latter, by exercises encouraging enforced expiration and measures which tend to lower the pressure within the empyema cavity In the successfully treated patient these two factors occur simultaneously Drainage and irrigation attenuate the infection and at the same time the lung gradually re-expands until the pleural space is finally obliterated. Not infrequently this re expansion occurs so slowly that although the danger to life for the time may be passed, a prolonged low grade infection causes either a delayed convalescence or results in a thickened, rigid, chronic empyema cavity

In the usual case of encapsulated empyema without bronchial fistula, open drainage following nb resection will usually suffice, provided aspiration treatment has not been prolonged beyond the point of usefulness. It is not always possible to decide at the onset which type of treatment will be the most efficacious but a sufficient number of cases of delayed healing have occurred with open drainage to stimulate many surgeous to use some form of closed drainage so that the advantages of

suction can be utilized

When drainage is carried out by means of a single tube entering the chest, one of two things may be accomplished If fluid is allowed to run into the pleural cavity we irrigate the cavity but at the same time the intrapleural pressure is rendered positive. If we create suction in the tube and thus encourage drainage and lung re expansion we are for the time neglecting the part played by irrigation

With these thoughts in mind we have designed a tube which can at the outset be used for either open or closed dramage regardless of whether mb resection has been done and with which alternate open and closed dramage can be accomplished in a single case at any time if the indication appears to exist If closed drainage is used both irrigation and suction are achieved simultaneously

Description of tube. The tube is made entirely of rubber and may be boiled again and used several times. It consists of a double tube with an external guard which when in place is flush with the external chest wall and covers the incision Each end of the guard is prolonged to form a strap which, when run through a button hole cut in adhesive tape or through a buckle, holds the tube firmly in place There is a thin rubber diaphragm on the flutter valve principle which may be used with open drainage to encourage re-expansion This latter idea is not new but the fact that the diaphragm is built into the tube has made it much more efficient than when a piece of

rubber dam is used for the same purpose

Open drainage It is possible to carry out open

dramage through an intercostal stab wound but when the pus is thick and filled with organized exudate, rib resection is usually desirable to break up pockets and remove fibrin If a stab wound is used thorough irrigation and suction of the cavity should be done in the operating room before inserting the tube. When a rib is resected the wound is closed with silk leaving a small opening for the insertion of the tube. The rubber guard covers the incision, the under surface of which is coated with flexible collodion or some other substance that will act as a skin protection

This tube appears to bave certain advantages when used simply for open drainage. There is no adhesive strapping in the vicinity of the wound to become saturated with pus and the dressing itself is quickly and easily changed—the gauze is laid over the tube opening and held in place with adhesive or a binder One of the chief advantages is that the patient can lie upon the affected side and greatly facilitate drainage, since there is no tube protruding from the chest wall Irrigation is easily carried out without removing the tube either by inserting a bulb syringe tip into one of the openings or by using a catheter

tube is held in place by its straps as described

Closed dramage If it is desirable to change from open to closed drainage or to institute closed drainage at the outset, two tightly fitting catheters which are first swabbed with collodion are drawn through the tube openings. The tube is then inserted into the chest and fixed in the usual manner To insure an air tight system it is essential that the rubber guard be held firmly against the chest wall This is accomplished by the use of sponge rubber about 1 mch in thickness and bevelled at the edges which is applied over the guard after a central opening has been cut out

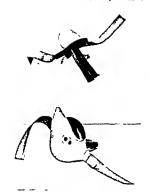


Fig 1 Photograph of empyema tube. The mirror view shows the posterior surface which enters the chest

to allow for the catheters This is held in place by several 2 inch strips of adhesive tape. The periphers of the sponge should extend beyond the edge of the guard about 1 inch. One catheter is now connected with the irrigating bottle and the other to the drainage tube.

Description of station irrigation system. The flow of solution is started from an open bottle A, the rate of flow being controlled by a Murphy drip, the opening in which is sealed with adhesive to exclude atmospheric pressure at this point. One catheter in the emprena tube allows for irrigation, the other for drainage. The solution flows into the chest cavity and out through the drain age tube to the collecting bottle B. The solution is first allowed to run rapidly in order to fill up the system and to cleanse the cavity. In the usual case the return flow becomes clear in a short time and with the filling of the system the negative pressure is established. The rate of flow is then cut down to about 60 drops per minute.

A consideration of the drainage tube will show the origin of the negative pressure. Drop 1 at the end of the tube, which should never become sub merged, is acted upon by gravity, and it is free to fall as soon as it has drawn drop 2 down to take its place. Drop 2 in order to move must draw



Fig 2 Photograph of empyema tube in place At this time the patient was being treated by the open draining method. The flutter valve is being held up to show the tube openings.

down drop ? Thus, force of gravity acting on drop I is transmitted through the column and through the drainage tube to the chest. The theoretical value of this force is found by measur ing the vertical distance from the entrance of the tube into the chest, which represents the level of fluid, and the exit end of the drainage tube For example, a vertical distance of 15 inches repre sents a negative chest pressure of -15 inches of water For all practical purposes we may assume that this is true and thus eliminate the necessit) of using a manometer to check the pressure. In arranging the setup the drainage tube from the chest should drop rather sharply to the drainage bottle and not be carried along for a distance horizontally before entering the bottle, because in this case the negative pressure in the chest would be fess than the vertical distance referred to, since part of the force would be exerted in overcoming the resistance to flow in the drainage line. If one feefs that it is necessary to insert a manometer it should be incorporated into the system at the same vertical level as that of the fluid in the chest It will be seen that with the pressure in the chest varying directly with the distance between the fluid fevel in the chest and the exit of the drainage tube change of the position of the pa tient would alter this pressure We do not believe that this factor is of any great importance but have obviated it by having the drainage tube enter a farger tube so as to allow it to slide up or down with any motion on the part of the patient

With this system of closed drainage no air tight bottles or suction apparatus is required The degree of negative pressure is easily controlled and changeable at any time by raising or lowering

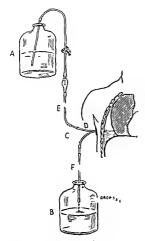


Fig 3 Diagram illustrating the continuous suction irrigation system of closed drainage

the dramage tube The required negative pressure will vary from day to day, depending upon the progress of the patient and the rate at which the lung is expanding. Likewise the rate of flow may be altered but in our experience of drops per minute is adequate after the dramage becomes clear. If one wishes to maintain a negative pressure and omit irrigation, a tube C may be incorporated into the system. Then by closing off tube D, the fluid runs from E to F, and the same principles of pressure apply, the only difference being that the chest is not irrigated.

For irrigation to be most effective the entire surface of the infected cavity should come in con tact with the irrigating solution. We therefore cut the two limbs of the tube at varying lengths, so that the tube holding the irrigating catheter will enter the cavity an inch or more while the one for drainage is cut so that it does not extend beyond the internal surface of the chest for more than half an inch. When one wishes to flush the entire cavity, the patient is made to lie upon the sound side when the fluid level will rise to the exit of the provumal end of the drainage tube.



Fig 4 Diagram illustrating the method by which the empyema cavity may be flushed

This tube has been used in a case of strepto-coccus emprema, a case of severe mixed infection following the rupture of a bronchiectatic cauty, as well as in cases of pneumococcus emprema. In the first 2 patients mentioned, aspiration treatment had been carried out for a considerable period of time and when suction-irrigation was initiated there existed a complete lung collapse with mediastinal hermation to add to the problem of infection. In every case the results have been satisfactory both from a technical and clinical standpoint, and we believe that the convalescent period has been very definitely shortened.

We believe that as a rule no patient should be discharged from the hospital until the lung has completely expanded, and many patients with empyema, although progressing reasonably well, obliterate their space very slowly. Such patients should have the benefit of some form of suction-irrigation treatment, which in the past we bave found difficult to do following rib resection. In our experience the situation has been considerably simplified with this ability to change from open to closed drainage and at the same time keep the empyema cavity clean with constant irrigation.

SUMMARY

- A new empyema tube is described which may be used for either open or closed drainage
- 2 A system of closed drainage is suggested which would appear to have the following advantages
- a No closed bottles or any form of suction apparatus are required
- b Irrigation and suction are accomplished simultaneously
- c With the employment of this tube closed drainage may be carried out after rib resection

The author wishes to express his appreciation to Mr John Howe who assisted him with experimental work, and to Mr Franklin Springer of the Davol Rubber Company who supplied, and assisted with the design of, the empyema tubes

SIMPLIFIED PROCEDURE FOR THYROID EXPOSURE

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HYROID surgery is facilitated and precision of technical procedures is obtained by the utilization of three important ands (1) the position of the patient on the operating table, (2) the control of hemorrhage, and (3) the complete exposure of the whole of the operative are

The technical procedures for subtotal resection of the thyroid have become standardized and most surgeons divide the ribbon muscles on each side of the median line to obtain adequate exposure of the thyroid gland. The space between the hyoid bone and the sternum is occupied by the so called ribbon muscles-the superficial group consisting of the sternohyoid and omohyoid and beneath these a broader and shorter muscle—the sternothyroid The usual procedure is to incise the cervical fascia in the median line and then to divide the ribbon muscles on each side between the upper and middle third. When this procedure is completed. by retraction upward and downward of the divided muscle groups and lateral traction on the sternomastord on either side, full and ample exposure is obtained In the course of our thyroid experience this bilateral procedure has been simplified by dividing both lateral groups of the ribbon muscles between two clamps thus giving an even larger and more ample exposure and making the operative field less encumbered by two clamps rather than hy four A superficial search through standard texthooks on surgery and a cursory review of recent technical literature does not depict this procedure but its simplicity must have suggested itself to other surgeons. Its application in thyroid surgery may be described as follows With the patient in a semi sitting position the shoulders resting on a sand bag the head extended, the entire field of the neck is draped and the usual partially curved thyroid incision is made, with a slight concavity upward The skin and subcutaneous fat are dissected upward on the upper flap and to a less extent downward on the lower flap until the platysma and subjacent muscles of the neck are brought fully into view. No attempt is made to divide the platy sma my oides as such, nor to leave it attached to the upper or lower skin flaps. With the surgeon standing on the right side of the patient, the

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superficial cervical fascia is divided for approxi mately 7 centimeters along the anterior horder of the right sternomastoid muscle A Parker re tractor with lateral traction pulls the fleshy body of the sternomastoid muscle outward exposing the pretracheal fascia as it moves forward from the parotid sheath The upper belly of the omohyoid muscles will be plainly visible, transversing this space from the hyoid hone downward and outward toward the scapula. The omobyoid is usually retracted upward and the pretracheal fascia in cised more or less paralleling the incision along the anterior border of the right sternomastoid The sternothy road muscle is readily identified and its lateral edge picked up with thumb forceps The index finger of the left hand can then be insinuated beneath the three ribbon muscles on the right side with the palmar surface of the finger passing anteriorly over the thyroid gland The finger passes readily beyond to the median line under the left group of ribbon muscles The index finger is then turned so that the palmar surface is turned upward and the same incisions are made on the left side at the anterior border of the sternomastoid muscle (Fig 1) The index finger of the right hand is inserted into the cleft thus made so that there is underneath both groups of ribbon muscles-the left and right-the index finger of the left hand and the index finger of the right hand The muscles are raised off the isthmus of the thy roid and two kocher clamps are inserted by the first assistant, one paralleling the left index finger, with the handle of the clamp on the right side of the patient, and the second clamp paralleling the index finger of the right hand and the handle of the clamp on the left side of the patient These two clamps are applied at approxi mately the junction of the upper and middle third of the muscle group (Fig 2) The muscles are then divided and, with a book retractor placed under each clamp, traction is made upward and downward, and the entire thyroid area is fully exposed (Fig 3) At the termination of the resection of the thyroid, the retractors are removed and the muscle groups approximated and united by three interrupted sutures of No chromic eatgut (Fig 4) A latex drain is placed in each thyroid fossa and brought out at approxi mately the midpoint of the sternomastoid muscles The lateral incisions on each side are approxi

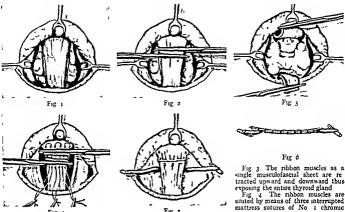


Fig 7 The skin flaps have been retracted and the ribbon muscles divided on each side to their attachment to the steruocleido muscle

Fig 2 The ribbon muscles on both sides are divided transversely at junction of upper and middle third

mated with interrupted sutures of No x chromic catgut (Fig 5)

The remainder of the operation consists only of the skin closure with Michel clips and the emergence of a drain on each side near the outer extremity of the skin incision (Fig. 6). The procedure outlined (1) has provided a more ample exposure than heretofore, (2) has lessened the number of clamps in the operative area, (3) has lessened the actual technical time of the operaFig 5 The musculofascial group of ribbon muscles are united on each side to the sternocleido muscles, after

the insertion of a drain on each side

Fig 6 The drains emerge laterally and the skin is united with Michel clips

tion, and (4) healing and subsequent course of the thyroid wound has been expedited Serum collection beneath the slan has been less frequent and the return of the normal contour of the neck

has, in our opinion, been hastened

No claim of originality is made for this procedure and our only purpose is to give emphasis
to an operative procedure that facilitates exposure
and as well lessens technical difficulties in thyroid
surgery

BUMPER AND FENDER FRACTURES

FREDERICK G DYAS, MD, FACS, and MORRIS L. GOREN, BS, M.S, MD Chicago, Illinois

RACTURES about the knee joint are not rare. Within recent years, however, they bave been brought into prominence largely through the increased use of the automobile as a mode of transportation and the application of the reentgenogram in making a disgrayer.

Only years ago F T Cotton and Richard Berg gave this type of fracture its name bumper fracture. They define a bumper fracture as a crushing injury produced by abduction of the leg forcibly enough to smash the external tuberosity of the tibia against the fulcrum of the lateral condyle of the femur. This is the classical type of bumper fracture. Due to the increased speed of the automobile and the attempt to increase the riding comfort the beight of the automobile chassis from the ground has been lowered. The bumpers and fenders have also descended to a lower level. The fact explains the recent types of bumper fractures, not at the level of the lace yound but 1½ to 2 inches below or even lower.

From the female fracture ward of Cook County Hospital Dr Coren fracture resident, Cook County Ho pital.

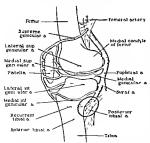


Fig. 1 Drawing of the circulation about the knee point. The heavy or al shows the most dangerous area for mote ment of the circulation of the leg. Injury of the vessels in this area leaves no channel for collateral anastomoses and gangene may frequently result. (Modified from Callen der)

The newer type of humper fracture has added the hazard of nerve and blood vessel involvement, which is more frequent than formerly

Within the past 6 months 4 cases of gangenee of the lower extremity were observed in the fracture wards of the Cool. County Hospital—1 case in a child with a fracture of the middle third of the femur, another in an adult male of 47, and 2 in adult females. Three of these 4 cases developed cyanosis, coldness, and blebs characteristic of most gangenee of the foot. These blebs became infected and required amputation of the leg. The other patient developed a dry gangenee of the distal end of the foot, requiring amputation of the loss.

PATHOLOGICAL ANATOMA

Harold G Lee in his article on fractures of the tuberosities of the tibia, cites the studies of the architectural structure of the upper end of the tibia made hy Barbilian, who has shown that the direction of the fracture line is determined in general by the disposition of the trabeculæ mak ing up the hony tissue. In a sagittal section these trabeculæ are separated into two systems, an anterior and a posterior which cross each other in The antenor and po tenor arch formation trabeculæ located lower down timish on the opposite faces of the bone, while the higher ones terminate on the articular surface itself Barbilian has shown (1) that the trabeculæ always cross each other perpendicularly and (2) that they fall perpendicularly on the articular surface allows the bone to withstand great pressure. In a frontal section 2 groups of trabecule are seen I for each tuberouty which start from the lateral faces of the bone and run perpendicular to the corresponding articular surface. The space between the 2 groups appears to be occupied by the section of the trabeculæ seen in the sagittal view These trabeculæ are bound by other trabeculæ that run in a horizontal direction. In a transvere section, the trabeculæ show between them little canals, the dimension of which varies according as they are located in front, back, or on the sides.

This explains the bie of fracture which is u u ally vertical in the direction of the trabecular exceptionally it may be oblique and rarely transverse. The direction of the fracture line varies of course, with the point of termination of the tra-

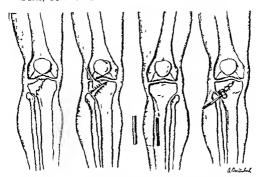


Fig. 2 Schematic drawings showing the major steps in the procedure for elevating the depressed condyle of the tubu. Reading from left to right 1, 3 tt pend depressed tuberosity of the tubu. 2 The depressed condyle elevated into position by means of an osteolome and held there by a retractor 3. The bone graft removed from the flat surface of the opposite tubus by means of an electric saw. 4. The bone wedges being driven in to maintain the depressed condyle in position.

beculæ The farther down the fracture line is from the articular surface, the more nearly vertical it is, with a tendency to become horizontal as it approaches the articular surface. In cases of direct fracture the lines follow no particular course. In these cases the line of fracture follows the line of force applied, and thus would appear to vary with the degree and duration of the force.

In the newer types of bumper fractures, vascular involvement with gangrene may result if the injury to the vessels occurs below the openings of the inferior genicular arteries, or veins, because no collateral circulation is possible (Fig. 7)

Cubbins and associates have classified fractures of the lateral condyle of the tibia into 5 types and have suggested treatment of each type

Type r Tracture of the lateral condyle The fragment is displaced outward with httle if any of the bearing surface depressed

Type 2 Depressed fracture of the lateral condyle A large fragment is displaced outward and the medial portion of the bearing surface is depressed obliquely downward and inward

Type 3 Oblique depression fracture of the bearing surface with only a small portion of the lateral fragment retaining normal level

Type 4 Depression fracture of the posterior portion of the lateral condyle, with the forward portion intact

Type 5 Depressed fracture of the anterior portion of the lateral condyle, with the posterior portion intact

ETIOLOGY AND MECHANISM

One may produce a fracture of the lateral tuherosity of the thia by falling from a height with the leg extended and an abduction force directed at the leg, or by an automobile fender or bumper striking the extended and locked knee Something must give way. In unusual cases there may result a tear in the lateral collateral ligaments of the knee or of the lateral condyle of the femur. The internal collateral ligament or the medial tuberosity of the tibia may be avulsed, but most often the lateral articulating surface of the tibia gives way and a knock knee deformity results.

N Barbilian, quoted by Arthur N Collins, was unable to produce fractures of the tibial head by mere internal or external rotation. When to torsion was added a direct blow, the fracture resulted

Elason is of the opinion that the point of contact of the femoral condyle with the tibial plateau will depend on the degree of flexion of the knee at the time of direct trauma. In flexion the posterior portion of the tibial plateau, or shelf, would tend to be crushed, while in extension, the crush would be more anterior, with a resultant "back-knee".



Fig. 3. Case 1. M. G. aged 26 years. Admission No. 162,856, Patient was struct, by an automobile while croswing the street and was admitted to Cook. County Hospi tall January 17, 1937. A fracture of the left that and fibula at its upper third was statend. There was a posterior deplacement of the lower fragments. The near genegram was taken the next day and shows good almement of the fragments after manipulation and closed reduction under other anesthesis.

Fig. 4. Case 1 M. 6. Peture showing the presence of marked cyanous of distall end of foot with a large bleb formation which became infected. Two days after entrance the patient began a septie course. Skeletal fraction was applied through a Stemmann and in the os calcula Amputation below the Lines was done on February 12 1937. The wound bealed cleanly. Union present in fracture. Note lines of demarcation below upper third of leg.

SYMPTOMS

Pain over the site of the injury is a constant finding. The kine joint is swollen and the patella may be floating hecause of the intra articular hemorrhage. There is limitation of flexion or extension depending on the type of injury, and there may or may not be a genu valgum depend ing on the position of the fragments. The history, symptoms, and clinical signs are inconclusive. The roentgenogram establishes the diagnosis



Fig 5 Case 2 H S aged 9 years Patient was struck by automobile and entered Cook County Hospital October 8 1936 with a fracture of the lower third of the femur Cangrene of distal end of foot due to injury to blood vessels

TREATMENT

At present, hone surgeons are divided into two camps when the question of treatment comes up for discussion. Cotton (3), Ehason (quoted previously), and Sever, to mention a few, would prefer not to operate on any type of fracture of the lateral tuberosity of the tibia

The non operative methods consist of manupl lating the fractured fragments into position and impaction by the Cotton method, such as striking a sharp blow with a mallet to bring the fragment inpward mito position, or using a redressure after the method of Forrester, or applying strong finger pressure to the fractured fragments, pushing them into place. The lane is kept in an overcorrected position during the manipulation and is fixed in a plaster cast, extending from the toes to the groun The cast is usually kept on for 6 to 8 weeks. After that, passave and active motion is begun. The patient is fitted with a walking caliper and no weight bearing is allowed for at least 3 more months.

To operate in an area of crumbled and crushed cancellous hone would add insult to injury. In case of wide separation of a good sized fragment of the tihial tuberosity without much comminu



Fig 6 Fig 7

Fig 6 Case 3 L C aged tr years, admission No 1621656, was struck by an automobile and admitted to Cook County Hospital in marked shock on December 26 1936 Reentgengram taken 8 days later showed marked swelling of the soft itssues and overriding of the bone fragments. The patient began a septic course; 3 days after admission. The foot was cold and cyanotic. There was absence of the dorsalis pedie pulse. Blieb formation and most gangrene developed. Amputation 2 weeks later did not reflexe sepsis Ostcomy. Gitts of the other leg developed.

Fig 7 Case 4 C W aged 68 years admission to 159074, was struck by an automobile and admitted to Cook County Hospital on September 6 1936 The patient was in marked shock. There were fractures of both bones of both legs in the upper third to cyanoss or gangrene developed The patient never came out of shock and died

September 15, 1936

Fig. 8. Case 5 A. W., aged 65 years admission No. 1523674 was admitted to Cook County Hospital May 8 1936, with a history of having injured her right knee when her heel caught in a knot hole while going down a wooden staircase. The right knee was wollen and painful. There was excess lateral mobility of the knee joint and the weight bearing line was disturbed. Manual mampulation and immobilization in a plaster case for 8 weeks. Out the amount of bone destroyed due to compression

Fig 9 Case 5 Roentgenogram taken 4 months after the injury showing regeneration of the depressed lateral tuberosity of the tibia but there is present a 'knock knee'' deformity The patient is shown wearing a walking caliper y wedge operation to raise the depressed condyle is

indicated

tion, crushing, or impaction, and manual or closed reduction failing, due perhaps to interposition of soft tissues such as fragments of senulunar cartilage, open reduction and fixition is indicated

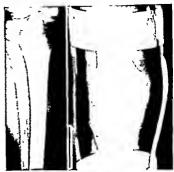


Fig 8 Fig 9

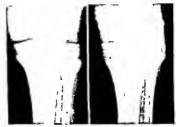


Fig 10 Fig 11

Fig 10 Case 6 Patient and 40 years, admission No 1598-12, was admitted to Cook County Hospital September 1, 1936 with a history of being struck by an automobile while standing on the street. Note the large bone fragment of the lateral tuberosty of the left bina with practically no depression. Attempt at manipulation failed to force the loose fragment in place

Fig 11 Case o Open reduction showed that the lateral mensucus was interposed between the fragments. The torn semilunar cartdage was removed and the fragment fixed in place with a long screw Roentgenegate taken 10 weeks postoperatively shows complete union. Note perfect weight bearing line

When there is marked valgoid deformity due to loss of bearing surface from impaction, Cotton's suggestion to do "Macewen's" supracondylar osteotomy should be considered



Fig 12 left Case 7 J L aged 48 years admission to 102,031 was struck by an automobile and admitted to Cook County Hospital January 21 1047 with a comminuted fracture of the upper third of the tibia and fibula Roentgenogram taken 6 weeks after the injury shows very little callus formation to union was present 10 weeks

after the original injury

Fig 13 Case 7 I hotograph of leg showing dry gan
grene of toes and slough on dorsum of foot

We wish to make a preliminary report of a spe cial technique devised by the senior author, F G Dyas for elevating depressed tuberosities of the tibia The procedure is essentially as follows

A longitudinal incision over the affected con dyle is made. The condyle is elevated to the level of the tibial articular plateau by an osteotome By means of a motor driven saw a graft 8 to 10 centimeters long and about 11/2 centimeters wide is cut from the flat surface of the opposite tibia The graft is then driven between the elevated condyle and the shaft of bone for about 2 cents meters and then cut off The same procedure is repeated until a row of wedge shaped portions of the graft completely fill in the hiatus between the small upper fragment and the shaft of the bone These small grafts exercise a continuous pressure upward upon the small articular fragment forcing it against the articular surface of the femur. The wedge grafts are introduced in such a manner that the cut surface of the graft will come in contact with the freshened surface of the fragments to favor osteogenesis. We have not followed our cases for a sufficient length of time to present data of comparative results, but wish to report this procedure with the hope that, perhaps, some other surgeons may attempt the same procedure and thus increase the number of cases in order that the merits of this operation may be evaluated,

SUMMARY AND CONCLUSIONS

x The recent types of bumper fractures occur below the knee joint and therefore the frequency of indirect traumatic gangrene is increasing

2 To operate in an area of crushed and crum bled cancellous bone would add insult to injury 3 A new technique is described for elevating depressed condyles of the tibia

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FRAGMENTATION AND EXPULSION OF A COMMON DUCT STONE INTO THE DUODENUM BY USING ETHER AND AMYL NITRITE

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→HE more general use of roentgenologic visualization of the common bile duct and hepatic duct by the injection of opaque substances into them both at the time of, and subsequent to, operation has assisted in determining the restoration of function of the extrahepatic biliary tract following surgical procedures (6) In this respect evidence of persisting pancreatitis is noted by persisting narrowing of the pancreatic portion of the common bile duct and dilatation of the duct above the enlarged pan creas Occasionally, reflux of the opaque substance into the duct of Wirsung is present. On a few occasions in our experience, subsequent studies of the common bile duct by this method have proved that a lesion which appeared to be a pancreatitis disclosed evidence of an intermittent spasm of the sphincter of Oddi, and in an occasional rare case a small carcinoma of the papilla of Vater was found (5) Following difficult operations on the gall bladder and common bile duct in cases in which patients were senously ill, we have, on two occasions, demonstrated the presence of stones in the ampulla of Vater, which produced clinical symptoms of intermittent obstruction In one of these cases the stone was removed surgi cally while in the other case fragmentation of the stone was produced by instillation of ether into the common bile duct, as recommended by Pribram The ether, in addition to causing fragmentation of the stone, increased the intraductal pressure By dilating the sphincter of Oddi by inhalations of amyl nitrite, as recommended by McGowan, Butsch and Walters, fragments of stone were forced from the common bile duct into the duodenum Roentgenographic evidence confirmed the clinical diagnosis of stone in the ampulla of Vater (Fig 1) and showed the fragmentation of the stone after several instillations of ether into the duct (Fig. 2) and the expulsion of the fragments into the duodenum Following this expulsion of the stone, roentgenographic examina-

From the Section on Surgery The Mayo Clinic, and the Division of Surgery The Mayo Foundation tion which was made after the injection of bromnol revealed that the outline of the common bile
duct was normal and that the bromnol passed
freely into the duodenum (Fig. 3). Closure of
the T-tube prior to these procedures was followed
by attacks of pain and pylorospasm, closure of the
T-tube subsequent to fragmentation and passage
of the fragments of the stone into the duodenum
produced no symptoms of biliary obstruction
The T-tube was removed, the sinus healed
promptly, and the patient has been free of any
evidence of disease of the biliary tract. He has
been in excellent condition since the middle of
Iebruary, when the T-tube was removed

REPORT OF CASE

A priest, 50 years of age, was first seen at the clime Norember o, 1920. A cholesystectomy had heen performed 1928. In the year before he came to the climic he had suffered on 2 occasions from symptoms of obstruction of the common bite duct, that is, but in the right upper quadrant of the abdomen, nauses and vomiting During the last attack, which had occurred only 2 weeks before we first saw hun, there had been associated chills, fever, and a mild degree of Jaundice. Examination revealed that the jaundice had subsided and the patient was in good physical condition. Because of the history of the 2 attacks which were characteristic of obstruction of the common bile duct, a diagnosis of a stone in the common bile duct was made

Exploratory laparotomy was performed on November 13, 1936 The stump of the gall bladder containing a stone was removed. The hepatic aftery was in an anomalous position, it crossed the common bile duct from left to right so that although the common hile duet was enlarged to about 2 centimeters in diameter, only a portion 1 centimeter in length was not covered by the artery In this ex posed portion of the common bile duet a small incision was made, a scoop was introduced into the ampulla, and a dark, irregular stone, which measured about 1 5 centimeters in diameter, was removed Because of the position of the anomalous hepatic aftery and the patient's obesity, it was impossible to explore the intrahepatic ducts as an exploring scoop or forceps could not be inserted upward around the curve of the artery It was necessary, therefore, to be con tent with dilatation of the sphineter of Oddi with a large sized scoop, which measured approximately 1 2 centimeters in diameter hoping that if stones were picsent in the he

patic duct they would pass through this dilated sphineter Postoperative convalescence was uneventful and the patient was dismissed from the hospital 18 days after the operation In all cases in which a T tube has been inserted



Fig. 1 Cheledochogram showing filling defect in the distal end of the common bile dart and a small amount of the medium in the duodenum.

Fig 2 Choledochogram made after the injection of ether and showing a fracmentation of the stone which was

to drain the common hile duct it is our custom to make a choledochogiam (4, 6) before removal of the tube. This is done to insure complete emptying of the common bile duct and hepatic duct in a 10 minute period and also to exclude persisting obstruction as a result of pancreatitis stones caremoma or spasm of the sphineter of Odds. A choledoche gram which was made December r 1936 18 days after the operation howed a dumb-bell shaped filling defect in the distal end of the common bile duct (Fig. 1) The pa tient was sent bome for a weeks and instructed to clamp his T tube continuously during the last week before he re turned to the clinic During this week, while the T tube was clamped continuously the patient experienced an attack of pain in the right upper quadrant of the abdomen with accompanying nausea and somiting. Jaundue was not present A second choled chogram which was made on December 28 1930 revealed that the filling defect was still

present in the distal end of the common lade duct.

Our exploration of the common duct had been thorough
at the time of the operation so we felt justified in assuming
that the stone which we could now demonstrate in the
common duct had been washed down by the flow of bule

from the hepatus ducts
In 1933, Firbram descrited a method whereby he had
been able to dissolve organs types of stones in the common
held duct by the impection of eithyl either through a T tube
leading into the common bile duct. Accordingly about 5,
cubic centimeters of eithyl either was, myetide very slowly
into the T tube dualy on January 3, 4, and 5, Tryp.— However,
was some painter of eithyl either was, myetide very slowly
into the T tube dualy on January 3, 4, and 5, Tryp.— However,
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the interested intraductal pressure which had been caused
by the rapid supportation of the either when brought to
the rapid supportation of the either when brought to

causing the filling defect.

Fig. 3. Choledochoram showing that the common life duct has empted without obstruction to the medium and that the stone which was causing the filling defect in the other figures has been expelled into the duodenum.

body temperature Care was exercised to have the T take open for at least 3 bours following each injection. A chart dochogram which was made on January 6 1937 researed a picture which we interpreted to mean that there had been a fragmentation of the stone in the distal end of the common bile duct (Fig. 2) The picture, we thought, demonstrated very clearly that small amounts of the radiopar, ue medhad infiltrated through fragments of the stone. We felt that we had been unable to introduce enough ether --the T tube at one time to insure that a proper amount of the solvent reached the stone. The rapid vaporization of the ether caused a rapid increase in the intraductal pressure which made it necessary to open the T tube. This was followed by a prompt expulsion of gas and hound. Therefore on Dr Osterberg's suggestion we used for our salesquent injections a mixture of a part ethyl alcohol and a parts ethyl ether Injections into the T tule were made again on January o 193" and January 12 193, By LNL of this mixture of ether and alcohol, we were able to meet about 5 cubic centimeters at a time before releas.. 5 the T tube and were able to use at least 10 cubic centimeters of the mixture each day On January 11 193" about 3 hours after the injection had been made, the T tube was comed About 2 hours later the patient began to experience rather severe pain in the right upper quadrant of the aldomen, with associated nauses. He was given the contents of a pearl of amyl mitrite by inhalation and the prompt relief of the pain was dramatic. A choledochygram, which was made on January 15 193" showed that there was no !defect in the outline of the common bile duct and that the duct emptied its contents readily into the duodenum (Fig. 3) The T tube was kept in place for another 3 weeks, during which time it was kept closed continuously. The patient

WALTERS, WESSON EXPULSION OF COMMON DUCT STONE INTO DUODENUM 697

experienced no discomfort or nausea during this time Consequently, the T tube was removed January 30, 1937, and the sinus tract closed promptly. The patient said, during a recent examination (April 2, and August 7, 1937), that be was in excellent health and had had no recurrence of his bilary symptoms.

SUMMARY

A case is reported in which the presence of a persisting stone in the ampulla of Vater was demonstrable by choledochography. Fragmentation of the stone with ether and expulsion of the fragments into the duodenium were accomplished by increasing the intraductal pressure by means of ether vapor and dilatation of the sphincter of Oddi by inhalation of amyl intrie. The value of postoperative studies of the conformation and the emptying time of the common hile duct, by roent-genographic means after the injection of opaque substance into the common hile duct, is emphasized.

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LOCALIZATION AND REMOVAL OF FOREIGN (METALLIC) BODIES

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HOUGH the removal of foreign bodies from the tissues, particularly needles imbedded in the hands and feet, is considered to be a difficult procedure, it is the opinion and experience of the author that if properly performed the operation should require little time and cause little difficulty.

Several rules concerning the subject may be stated

1 The time required for, and the case with which, removal of the foreign body can be accomplished, is proportional to the accuracy with which the object is localized (which includes accurate skin markings) and the care with which the operation is planned

2 No massive dissections should be necessary, the removal of the foreign body (needle) seldom requiring an incision longer than 1/8 of an inch

3 The anatomical part containing the foreign body should be fixed and beld in an optimum operating position from the time the localization

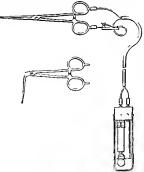


Fig 1 Diagrammatic sketch of apparatus showing forceps lighting device and contact button

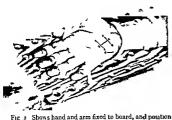
and skin markings are made until the foreign body has been removed

4 Removal of a foreign body should never be attempted without the aid of a fluoroscope

Since the same principles and method may be applied to other parts of the body, the removal of needles from the hand only will be described here

Locals_atson The hand is thoroughly scrubbed with soap suds dried, and fixed with tape ties to a perforated board as shown in Figure 2 Under the fluoroscope, the position of the needle is now marked on the skin in the following manner An ordinary paper clip is straightened out leaving one loop as a handle, and the clip is placed on the skin and superimposed over the image of the ncedle as seen on the screen. The clip held in this position on the skin is used as a ruler, and a line is drawn on the skin with gentian violet The line 1 B in Figure 2 is thus obtained Under the fluoroscope again the ends of the needle are marked resulting in lines CD and EF, Figure 2 Now either the hand or the fluoroscope (if a portable machine is being used) is rotated until a lateral view is obtained and the marking G H in Figure 2 is made and indicates the depth as well as the direction of the needle, for it is essential to determine which end of the needle is nearer the

Removal The apparatus which has been de vised and is illustrated in Figure 1 consists of a forceps of desired shape and size, which has been so insulated and so constructed that its contact with a metallic object closes an electrical circuit and lights a battery controlled lamp The light ing device may he plugged onto the forceps desired A contact button is incorporated for making and breaking the circuit since constant electrical current produces a slight but harmless bubbling in the tissues. The apparatus is a single unit and therefore serves both to indicate when the metallic object has been reached and to grasp the object Contact with a nerve will produce a reaction and indicate that an important structure hes in the operative field Only full contact with the metallic object will complete the circuit so that the interposition of any tissue grasped hetween forceps and needle will prevent the lamp from lighting



of needle marked on skin

Extraction of foreign body The hand, fixed to the board, is prepared surgically as the operator desires Under local anesthesia an incision 1/4 to 3/8 of an inch long is made through the skin over the most superficial end of the needle For a needle in the position as shown in Figure 2, the incision would be made at point B Under certain circumstances, however, it may be advisable that the incision for approach be made over the middle of the needle This, however, the operator must plan carefully and accurately A pressure bandage applied over the incision for a few minutes will generally control the skin bleeding With the hand again under the fluoroscope, the selected forceps is inserted into the wound and gently directed toward the needle Contact of forceps tip and needle will be indicated by illumination of the lighting device. The forceps is now opened and with it the needle is gently grasped A steady illumination indicates that the needle is in the jaws of the forceps, and that no tissue is interposed. The forceps is closed, the hand is removed from the fluoroscope, and the needle is easily extracted. If the needle has been grasped too far from its end for easy extraction through the incision, it may be pushed up against the skin a short distance from the incision and through a minute incision over its palpable end can easily be extruded and extracted No suturing is necessary. A simple, firm dressing and



Fig 3 In this photograph the long scar represents an nicision made several years ago for removal of a needle, the short one represents incision made recently for removal of needle by forceps method (The scars have been inked for better visualization)

bandage are applied The removal of the needle seldom requires more than a few minutes In parts of the body where anteroposterior and

lateral views may easily be obtained under the fluoroscope, it is well to approach the foreign hody as bas heen described, then to rotate either the fluoroscope or the anatomical part at an angle of 90 degrees and to continue the approach. This procedure enables the operator to observe the distance between the forceps and the object. The foreign body lying in a muscle helly may be seen to move as the forceps lying close to the foreign body is moved. One should not be misled by this fact in believing that contact has been made with the foreign hody. Only when the lighting device indicates that contact has been made with the metallic object should the extraction be attempted.

SUMMARY

A simplified method for extracting metallic foreign hodies is described emphasizing a new instrument

With the aid of this instrument and the method of localization described, extensive and tedious dissections should be infrequent

A NEW SUTURE FOR TENDON AND FASCIA REPAIR

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IN REPAIRING defects of tendons and fascase the tension of the retaining suture tends to cause separation between the fibers and may result in maccuracy and weakness of the suture line Research work previously reported! has shown that the fibers themselves have relatively high tensile strength, and histological studies have shown that these fibers are covered with a delicate layer of messtibility and the shown that these shown that these shown that these fibers are shown to be the shown that these fibers are shown to be the shown that these fibers are spaces which permit synchronization of move ments of this tendon.

The method of repairing defects in tendons and fascus should be so designed that the strength of the fibers themselves be fully utilized and any slippage should be a toided. The end of the tendon or fascus is re enforced by using a suture which forms an everted V, the apex of the V pointing

From the Department of Surgery Division of Orthopedics Columbia University New York Post Graduate Medical School and Hospital and City Hospital, New York

¹Cratz Charles Murray Biomechanical tudies of fibrous tissues applied to fascial surgery. Arch Surg. 1937 March



Fig r Photomicrograph of the Achilles tendon The fibers are approximately parallel and spaces will be noted between the groups of fibers as well as the above themselves.

toward the defect. The details of placing this reenforcing suture are shown in Figure 2, A and B This is obtained by using a figure of eight suture. the portion forming the V being illustrated by heavy lines After the re enforcing suture has been placed in position the repair is accomplished by placing the retaining suture through the V of the re enforcing suture (Fig 2 C) When tension is applied to the re enforced end of tendon or fascia it is immediately transferred through the re-en forcing suture to the fibers themselves. The same engineering principle is used in handling a cable composed of individual strands of wire A similar technique has been successfully used by the author in designing instruments for hving suture repair 2 Figures 3 and 4 show the re enforcing and retaining sutures in place demonstrated on a human tendon Sill has been found satisfactors for the re enforcing sutures, while either foreign material or hving sutures may be used for the retaining suture depending on the surgical judg

*Gratz Charles Murray New instruments for living sutures Am J Surg 1931 S 81-82

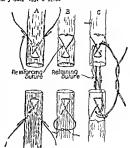


Fig. 2. The method of placing the re-enforcing submr. 3 shown in A the method of tying in B. The heavy dotted lines in B represent the finished A The method of placing the retaining suture through the Vs is shown in C. Whether a single or a double suture is used depends on the pudicular less of the pudicula

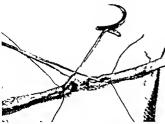


Fig 3 The re-enforcing sutures are shown in place before they are tied. In this case a living retaining suture is being used

ment of the operator If a tendon or fascia is being sutured to bone only one re enforcing suture is necessary. In the case of repairing



Fig 4 The three sutures finally in place

defects in individual tendons or in fasciae two re enforcing sutures, as illustrated, are necessary. The strength of internal fixation by this method has been found to be adequate, and the method has been used chinically for several years with satisfactory results. Increased suture strength and accuracy of internal fixation allows much earlier motion.

OPERATIVE CHOLANGIOGRAPHY

P L. MIRIZZI, M D, F A C S, Cordoba, Argentina

THE third Argentine congress of surgery in Buenos Aires, in 1931, I called attention to the advantages of cholangography, during operation, in revealing the nature of the obstruction present and the functional capacity of the bile passages. More recently, in a series of articles, I have reported the results of instudy of the physiopathology of the hepatic and common ducts of the diagnosis of their pathological states (4-70), and of the surgical procedures indicated in disease of the principal exerctory duct (11-13)

Cholangiography as I use it is part of the opera tion itself. It provides a degree of diagnostic precision such as has never before been attained by other exploratory means. Correct execution of cholangiography and the exact interpretation of the different roentgenographic images obtained become indispensable parts of the abdominal exploratory procedure and necessary requisities in deciding as to whether or not the abdomen should be closed without drainage after a cholecystee.

From the l'aculty of Medicine Cordoba Argentina



Fig. 1 from left to right Ten cubic continueter syringe Cannula 14 centimeters long the caliber of a No. 13 Chartere with a 19 millimeter diameter olive tip cannula 12 centimeters without 10 millimeter olive tip which is at one side, needles for puncture of common ble duct. 1⁴/2 millimeter diameter cannula of same caliber as the needle for cathetering the cystic duct

tomy This use of cholangiography is obviously so different from all other uses made of it that I propose to eall it "operative cholangiography"

ADVANTAGES OF OPERATIVE CHOLANGIOGRAPHY
OVER OTHER PROCEDURES

In order to formulate an opinion as to the condition of the principal bile passages, the surgon has, apart from operative cholangiography, other factors upon which he can base his decision (1) the pre operative data, (2) the findings at opera tion, and (3) fistulography in the postoperative period. In the first group we bave the chincal findings, the roentgenological study - both direct and after the injection of tetrajodine-in addition to the Graham Cole method In the second group we have intraperatoneal inspection and palpation, the mobilization of the duodenum and subsequent palpation, choledochotomy and instrumental ex ploration In the third group we have a means of study through injection of opaque material through the drainage tube (gall bladder or common bile duct) or through a fistulous tract

Pre operative information As to the clinical

findings, every surgeon and physician has had many opportunities to observe the lack of rela tionship between symptoms and anatomical le sions in the bile passages. Some patients give a history of having had hepatic colic and jaundice, sometimes extending over long periods of time, but in them the principal bile passages seem to be completely free from obstruction, either calculous or mechanical In other patients gall stones are found associated with spasm at the level of the sphincter of Oddi or with anatomical obstructions in the termination of the common bile duct in such patients there will be noted a periodical re gression of the canalicular defects Some patients give a history of painful intermittent crises, with out fever or jaundice, which suggests chronic cholecystitis, but careful exploration reveals the pres ence of gall stones and dilatation of the bile passages Even in the much discussed question of jaundice whether of hepatic or mechanical origin, in spite of the possibility in the great majority of cases of solving the problem by means of chinical examinations and study of the function of the liver, there are cases in which doubt remains-the

patient's condition becomes aggravated and it be-

comes necessary to clear up the diagnosis



Fig. 2 The cannula 12 centimeters long and the caliber of a No 13 Charriero is inserted into the cystic duct which is held on 2 loops of thread It will be observed that the cannula enters only the proximal one third of the duct

Direct roentgenography before operation rarely gives data of importance in the study of the principal bile passages except that calculi or concretions located in the gall bladder and common bile duct are occasionally visualized (14) Personally,



Fig. 4. Diverticulum formation in the proximal third of cystic duct the inner wall of which had to be incised, while it was held in the hand, in order to extract a calculus the size of a hazelnut (Drawing made from the actual organs)



Fig. 3. Taken from an actual case of selero atrophic gall bladder, in which a stope was found embedded in the prox mal third of the cystic duct. Against the resistance of the stone, an opening was made with the point of the kinite to allow the passage of a cannula 1 5 millimeters in diameter

of the hundreds of cases observed, in only r have I visualized stones in the common bile duct by means of direct roentgenography, so that I have come to helieve that this procedure cannot be

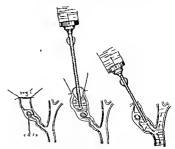


Fig 5 Diagram to illustrate the condition in case shown in Figure 4. The second drawing shows the disadvantage that would be obtained by injecting above the obstacle. In the third drawing the causula has passed by the obstacle, making it possible to inject the lipiodol.

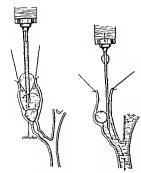


Fig 6 Diagram representing the situation which arises when a calculus is intimately embedded in the wall of the cystic duct the mobilization might rupture the duct or produce fragmentation of the stone.

relied upon Roentgenographical study, in conjunction with the method of Graham Cole, has made possible the visualization of the common bile duct in some pictures obtained in the course of cholecy stographic examination of asthenics (3)



Fig. 8. The vestibule of the gall bladder is pulled upon with a Grégour forceps. The needle has punctured the common bile duct and is within the lumen of the duct, indicated by the drop of a hurated bile in the syninginset, method of transfirm to obliterate the opening before withdrawing the syrange after injecting the lipidod



Fig 7 The clive up is fitted to the cannula when the cystic duct is delated. In inset the clive up is shown separate from the cannula.

However, we cannot count upon this source of in formation as far as the pathological condition of the ducts is concerned

Departs is information Palpation of the common bile due in the course of laparotomy is effective inthin subjects, especially to locate concretions of some size situated in the most accessible part of the duct. In the stout subject, if the pancreas is always, exail calculum the inferior third of the common distributions.



Fig. 9 Operating theater showing special arrangements. The patient is on the Potter Bucky diaphragm and is covered with a sterile sheet. The radiologist is ready to put into use the portable x ray apparatus.

mon bile duct or in the papilla of Vater easily pass undiscovered It is necessary also to be forewarned against the possible existence of neighboring calcified nuclei which may lead one to do a useless choledochotomy In obese women, the superabundance of fatty tissue makes palpation of the hilum of the liver and neighboring regions difficult. The fatty tissue in these patients lessens the sensation that foreign bodies might give, and the surgeon, through the oegative information obtained by digital examination, fails to discover calculi in the principal bile passage. The exploration is more difficult if adhesions exist, if the pancreas is increased in size, and if the liver is hidden beoeath the costal arch

As to duodenal mobilization, it has been suggested that palpation be done after the duodenum has been mobilized, following the Kocher technique This operative procedure can be done without inconvenience in some cases, it is true, however, that in precisely those patients in whom it would be of the greatest help, difficulties are met Obesity, adhesions, a deep seated organ, and friability of tissues, make duodenal mobilization difficult Moreover, it should not be forgotten that in patients in a precarous general condition the dislodgment of viscera increases shock and the possibility of postoperative complications, an operation free from brusque and traumatizing maneuvers should be chosen

Choledochotomy followed by instrumental exploration is much safer than simple palpation This has been advocated when the hepatic duct has thickened walls and is dilated. It is not always possible to be sure of these details, but in a normal supraduodenal common bile duct, this finding does not preclude the existence of concretions in the distal third of the duct. It is clear that choledochotomy does not lead to ill effects when the duct is of greater diameter than normal. but incision of a normal duct is more serious in that it may lead to stenosis

As already stated, choledochotomy, recently freely used, is, without doubt, a richer source of information than simple palpation Still, oce must agree, and in this surgeons of great experience are of the same opinion, that in exploring the hepatic and common bile ducts, it is possible to slip alongside a calculus without the metallic sound detecting it, to the same way it is impossible to recognize intrahepatic concretions Furthermore. even though some calculi have been removed, it is impossible to be sure that all have been removed, and here again, as foreign bodies are easily displaced and as the exploring sound may slip by the side of the calculus passing ioto the duodenum. we may have the erroneous conviction that no obstacle exists A review of the many articles dealing with the postoperative study of such cases by means of lipiodol injection in order to discover overlooked concretions, will convince one of this

Also it is true that if there exists a partial or complete obstruction due to pancreatitis, it is impossible to he sure of its nature, for the instrument may pass with difficulty or may be detained

In dealing with stenosis of the principal bile passages. I will not omit recent discoveries Vivisection and the study of the results of operations upon the bile passages are concerned especially with the sphincter of Oddi. The role played by this muscular ring in the principal syndrome of the right hypochondrium with or without jaundice, is important. It is of particular interest to the surgeon to know whether stricture of the papilla of Vater has an anatomical underlying cause—that is, an inflammation of the sphincter of Oddi, or if the stricture is simply a result of temporary spasm caused by irritation. When an instrument overcomes with some difficulty the resistance offered by the papilla of Vater, the impression is gained that stricture is present but the impression is not sufficiently accurate to affirm whether the strieture is of an anatomical or functional nature. It is absolutely necessary that the surgeon determine this point for it is on this factor that he will base bis treatment in the case of spasm it will be sufficient to eliminate the local or distal cause of the spasm, while in the case of stenosis or obstructing inflammatory condition in the sphincter of Oddi. deviation of the bile will have to be considered Furthermore, it is possible for the point of the exploring instrument to enter a cul-de-sac and the impression is given that instead of passing through a permeable papilla, a stenosis is met that does not really exist

Gentle exploration, of course, if it reveals noth-10g, has no other untoward effect than that of a useless preliminary choledochotomy, if it is ruthlessly done, however, it may traumatize the pancreas, causing grave complications All maneuvers in the vicinity of the papilla of Vater predispose to acute hemorrhagic pancreatitis (Schnitzler-Wal-Doppert observed in Schnitzler's clinic 5 cases of postoperative pancreatitis in 50 operations upon the hile passages, 4 were confirmed at autopsy The author concludes that any traumatizing manipulation at the level of the transpancreatic portion of the common bile duct and the ampulla of Vater is apt to produce pancreatitis Here is a further reason, based on the immediate result. for making us hesitant and prudent about the use of instrumental exploration near the head of the pancreas—the region least accessible to the palpating hand and exhibiting factors likely to produce untoward consequences

Pastoperative cholonguography The injection of inpudol or some like medium through a fistula or drainage tube after operation is indicated when it is desired to determine the permeability of the bilian network. It is done when the condition of things has changed since operation.

Anatomical or functional lesions are susceptible to modification through simple drainage and in surgery of the bile passages in order to chminate the possibility of recurrence of the obstruction in the distal portion of the common bile duct even when there exist well founded bopes that chole ex-stectomy will give relief, it is necessary that the exact intensity and nature of the lesions be apprecrated during the operation itself. If this knowl edge is lacking there is the risk that it may be too late to give relief when the changes have been discovered Kehr's drainage and common bile duct tistula, more than cholecystectomy create functional conditions which differ somewhat from those present at the time of operation. This regressive action which is favored by external deviation of the hile is e-pecially true in the presence of spasmodic derangements of the sphincter of Oddi, of incipient strictures of the papilla of Vater and of beginning stenosing pancreatitis. In Professor Haberer's clinic examples have been known in which external choledochoduodeno-tomy had been performed in spite of the fact that hy means of the T tube permeability of the papilla was found. These were cases of stenosis due to inflammation of the sphincter of Oddi in which the stricture of the papilla of Vater and lack of contractility of the hepatic and common bile ducts were the factors producing hiliary stasis and made necessary a second plastic, operation in order to give relief (18)

No one can ignore the importance of this means of di-cove enion or enclosed concretions or for ascer taining whether the anatomical stenosis is of the papilla of Vater or the result of pancreaturs, all lesions for the recognition of which manual or in strumental exploration has been found insufficient or impotent. It is also indisputable that to correct such errors it is necessary to perform a second operation which in the majority of cases is difficult and beset with trouble.

INTRINSIC ADVANTAGES OF OPERATIVE CHOLANGIOGRAPHY

Other authors have recognized the importance of operative cholangiography as a means of studying the principal bile passages and have recommended its application. Recently I called attention to the usefulness of custocduodenostoms (o II, I₃) in incomplete obstruction, either functional or anatomical, beyond the excretors ducts, by which internal scrition is maintained and the tone of the hepatic and common bile ducts is conserved. These lessons are recognized as such by means of operative cholagiography, thus making possible the institution of a physiological therapeutic measure, based on the conservation of an anatomical structure, the cistuc duct, which would be sacranced in the course of cholery steetown as usually performed

In studying the functions and the anatomical conditions of the bile passages, operative cholangrography is of great help it gives a scientific basis for closure without drainage after cho'ecvitec-The bile in the peritoneum observed by surgeons who believe its presence is due to slipping of a ligature, in most cases is testimons that there is an anatomofunctional lesion of the hepatic and common hile ducts that has not been noticed because of the maccuracy, deceptiveness and lack of precision in the methods of exploration used Bile in the pentoneum may also be caused by a supernumerary duct, which generally opens into the hepatic surface of the gall hladder Indeed, observation of the bed of the gall bladder during the hprodol injection disclosed that small drops leave the cut duct, which is brated like any vessel.

Operative cholangography makes possible the recognition of non-calculous obstacles in the termination of the common hile duct (spa.m., indiamed sphiniter of Oddi, painceathis) it maintenance precise the indications for cystocolundence tomy. Operative cholangography has placed crocoducednostomy among the preferred therapeatic measures in the treatment of gall hinder disease.

Operative cholangiography gives precise information even as to the smallest stones at the papilla of Vater, it is this location which harbost he highest percentage of overlooked calculi-

the highest percentage of overlooked citicin.
Intrahepatic calcula lab oar edifficult to mad
with other methods of examination and it is tie
opinion of surgeons of authority that operative
cholangography is the method which offers the
greatest chances of locating such stone. Sant's
and Mallet Guy say, "La cholangographie as
ours de loperation, telle que Mirizi I a conque
est pratique sur une large echelle, nous parait
aussi trouver dans le titude de la lithase des voe
biliantes mitrahepatiques une particulere justifica
tion" (15). In my private records I have examples of intrahepatic calcul which were recognade
through operative cholangography. These cases
are evidence of the truth of the assertion of the

Lyons surgeons One of the great advantages of operative cholangiography is that with it it is possible to study carefully the condition of the bile passages before and after the extraction of the calculi and to determine the true condition of the common bile duct, thus secondary operations are avoided

Without investigation with lipiodol in the ways advised, it is difficult to recognize pancreatitis and obstructive inflammatory disease of the sphincter of Oddi, in association with stones in the common bile duct My experience has shown that pancreatitis and inflammation of the sphincter of Oddi in the presence of stones above the stricture are more frequent than is believed. In such cases recurrence of the stones is no strange event, if special attention is not paid to the anatomical lesion at the distal portion of the common bile duct (12)

Operative cholangiography makes orientation possible when the pseudotumoral form of cholelithiasis is encountered. In these cases the hepatic space is blocked by a mass formed by agglutination and the firmly adherent organs The surgeon is in doubt as to whether he is dealing with a neoplasm or an inflammatory condition, especially if jaundice of the obstructive type is present one is fortunate chough to locate the gall bladder hy puncture and to extract bile, operative cholangiography, after the injection of the lipiodol into its cavity, will give very useful information which will help in making a decision as to the proper treatment

The precise information furnished with operative cholangiography makes it possible to limit manipulation to a great degree, only strictly necessary procedures being done, thus giving maximum security We all know how difficult manual exploration is, especially in men-the rigid thorax, the liver in retroposition, a blocked subhepatic space, a sclerotic and atrophied gall bladder, pancreas generally enlarged, and the greater depth of the hypochondrum, all of these factors tend to make manipulation more difficult, furthermore, every day experience confirms the great seriousness and the higher operative mortality in man (17, 19)

From the point of view of technique, investigation of the common bile duct is simplified, hecause the injection of lipiodol through the cystic duct diffuses and distends the stenosed hile passages in the pancreatico-duodenal portion, which is revealed as being distended, standing out in relief in the hilum of the liver, under these conditions incision presents no difficulty and operative accidents are avoided

UNJUSTIFIABLE OBJECTIONS

In my service operative cholangiography is carned out during operation in all operations upon the gall bladder and the bile passages The method is entirely innocuous, a fact that is proved by its use in 400 patients operated upon on my service without any inconvenience whatever

It has been objected that hpiodol may be the hearer of micro-organisms. If the present ideas regarding infection of the bile passages are borne in mind, this fear is unfounded. My personal experience has demonstrated that there are no bad effects from this standpoint, I have used operative cholanguography in all cases of suppurating angiocholitis and have had no ill effects from its use

Lipiodol has been thought to produce toxic phenomena I wish to emphasize that the quantity of lipiodol I inject is minimal, the pressure used is insignificant and one might say that the substance penetrates spontaneously

It has been argued that operative cholangingraphy prolongs the operation. It must not be forgotten that in many cases the future welfare of the patient depends upon these few minutes of waiting Remember the great benefits obtained in surgery of the nervous system, in the meticulous technique of gastrectomy as followed by the Austrians and the Germans, and in the careful execution of thyroidectomy for exophthalmic goiter, all these afford sufficient basis for recognizing how valuable is a patiently, carefully performed opera-The bile passages deserve no less careful treatment

The objection has been raised that operative cholangiography requires the use of local and regional anesthesia. To my mind, far from being an inconvenience, this is a great advantage. By avoiding general anesthesia, which is badly tolerated in obese patients, postoperative complications are less frequent Everyone agrees that, thanks to local and regional anesthesia, operations on the bile passages have lost their gravity, and operative mortality has been greatly lowered

Naturally, when the patient presents some nervous disorder (hysteria, epilepsy, etc) or when the glands of internal secretion are not functioning normally (tetany, hyperthyroidism), general anesthesia is indispensable. In such patients one must be satisfied with palpation of the passages and choledochotomy, moreover, there remains the recourse to cholangiography, the lipiodol being injected through the drainage tube in the common bile duct

On my service, in the few patients who were finghtened at operation or who were very sensitive, it has been possible to inject lipiodol directly into the cystic duct or into the gall bladder under regional anesthesia so that the surgeon or radiologist could accomplish all that was necessary when the occasion arose

TECHNIQUE

Material required A glass to cubic centimeter syringe is used for the injection of the hpiodol The syringe bas a metallic piston which is provided with a screw stem. The beak of the syringe must be adaptable to the cannula or needle as required Three cannulas are neces sary Two to have the caliber of a No 13 Charnere, one 12 centimeters and the other 17 centimeters in length, the third cannula is of the same diameter as the needle, t 5 millimeters. When it is necessary to produce a bermetically tight connection while using a cannula of large caliber in cases of dilated cystic ducts, an olive shaped adapter, to to 15 millimeters in diameter can be fitted to the end of the cannula (Fig. 1) A bottle of 40 per cent lipsodol is part of the equipment.

Technique of injection The injection of the contrast substance can be made (a) into the gall bladder. (b) through the cystic duct. (c) after

puncturing the common bile duct

Injection into the gall bladder is indicated when it is madvasable to mobilize a gall bladder, the cavity of which has not been cut off from the bile passages. Lipudodl, to the amount of no to zo cubic cenumeters, is injected into the body of the gall bladder after the bile has been aspirated. The point of puncture must be ligated when the needle is, withdrawn. Light pressure is sufficient, in cases free from concretions and with classic walks for the lipidod to flow into the bile passages in other cases in which the walks of the gall bladder are like cardboard and the cystic duct is dilated the flow of the lipidod is rapid and spontaneous.

This technique bas made it possible in some cases to determine the bepatic origin of jaundice when the clinical and laboratory investigation did not solve the question It was possible also in certain cases of jaundice due to sluggisdness in the principal bile passages, to male the diagnosis with certainty Injection of the gall bladder is indicated in the pseudotiumoral form of lithiasis, in which all the organs form one sub-bepatic block and only the tip of the gall bladder is accessible Naturally, permeability of the cystic duct is essential easy and abundant asparation of bile indicates that the organ bas not been occluded

Injection through the cystic duct. In all those cases in which cholecy stectiony must be done, I pay particular attention to the dissection of the

vestibule and the cystic duct, because, by this route, almost all the injections are made. Four different varieties of cystic ducts may be found (a) those of normal and catheterizable calber, (b) those of normal cathet but in which catheten zation is difficult, (c) those obliterated by car tissue or calculus (d) those which are diabeted.

In the normal cystic duct, injection is done with the cannula without the obve tip A part of the vestibule is always systematically left and this is held by two loops of thread while injection is

made

In the second type, the difficulty is due almost always to the Heister valves which become most fully developed in the vestibular extremity. It is sufficient in these cases to use the fine cannula, which will pass the obstruction and will not rupture the gut. For example, in a thin walled cystic duct, the ordinary cannula with the olive tip was inserted. The lipiodol did not pass the first part of the cystic duct which indicated that the delicate wall would burst if the process of injection were persisted in, the proximal one third was catheterized with the fine cannula, the injection then being made without difficulty. We congratu lated ourselves on baying made use of this means because it was possible with it not only to make a cholangiographic examination but also becau e we finally had to perform a cysticoduodenostomy as we were dealing with a difficult case of sluggish ness (dyskinesia) of the principal bile passages (Huenz Sanatono operated upon August 22,

1933 Case 55, third senes) Obliteration of the cystic duct by scar tissue is exceptional. In my sense of cases it occurred in only 2 per cent of the cases. The obstruction is rarely near the opening of the cystic duct, usually it is found near the vestibular extremity of the duct. One should not be surprised when in some cases, the duct is apparently obliterated and jet appears to be permeable when the first drops of lipiodol are injected, because of the action of the hpiodol the walls "unfold" When the obstruc tion is in the first part of the cystic duct, a small opening below the stricture is made with the point of a knife The opening is made sufficiently large to allow the passage of a time cannula (Fig. 3), if the obstruction is proximal to the puncture wound in the duct, there is no alternative but to puncture

the common bile duct.

Obliteration of the cystic duct by stone is frequent and generally caused by only one stone. It is not unusual, however, to find stones in line in the duct. In these cases the gail bladder may or may not have been extirpated When the sail bladder has not been removed, a small opening is

made just below the calculus, large enough to allow the passage of a fine catheter (Fig 3) When the injection is completed care must be taken to avoid regurgitation of the lipiodol by closing the small opening by means of a fine thread suture, with a fine needle When the gall bladder bas been extirpated, the stone can be removed from the duct by gentle maneuver, if resistance is encountered, it is inadvisable to be too strenuous because of the risk of traumatizing the walls of the duct or of breaking the stone, thus facilitating the passage of fragments into the common bile duct On the other band, it is difficult to determine whether the immobility of the stone is due to its being closely embedded in the walls, to the valves of Heister, or to the presence of a real diverticulum (Fig. 4), the most practical thing to do is to pass a fine cannula to one side of the stone and make the injection (Figs 5 and 6) A ligature is provisionally made after the injection at the level of the vestibule

In the fourth type, those in which the duct is dilated, the olive up is fitted to the No 13 Charnere cannula to avoid regurgitation of the lipiodol (Fig. 7). This technique is also followed when the gall bladder is sclerotic and atrophied. In such cases the cystic duct is often so short as to be confused with the vestibule, and the impression is gained of the latter opening directly into the common bile and bepatic ducts.

Paneturing the common bile duct. Thin, elastic walls in the common bile duct are unfavorable for puncturing. Frability favors tearing and enlargement of the orifice made by the needle, injection of lipiodol carries with it the risk of infiltrating the cellular tissue at the hilum of the liver Fortunately, puncture is usually made in dilated ducts which have solid and thickned walls, puncture is preferably made without stripping the peritoneal covering from the duct, especially if the walls are thin

Visibility of the duct is improved if one takes the precaution of gently pulling upon the vestibule with a Gregoire forceps Puncture is made with the needle mounted on the syringe nine-tenths full of lipidod, the object of leaving a space empty is to facilitate aspiration of bile, thus making it more certain that correct insertion of the needle bas been made (Fig. 8) When we are certain that the needle is within the common bile duct, the lipidod is injected at once Before the needle is withdrawn, a fine needle with linen thread is used to obliterate the tiny orifice, by transfixion (Fig. 8) This detail is important, especially in those cases in which the common bile duct is surrounded by lax cellular tissue, a circumstance

facilitating the diffusion of the lipiodol immediately after it escapes through the perforation

Precautions and dosage As a general rule, it must be remembered that the better the tone and activity of the bile passages, the slower and smaller the injection will be In a common bile duct of normal diameter or slightly dilated and with elastic walls, if more than is necessary is injected, the risk is run of producing spasm in the papilla of Vater or of favoring purely mechanical penetration into the duct of Wirsung Naturally all these accidents and errors are easily avoided by injecting the lipiodol slowly and in small quantities. In general we inject at the rate of 1 cubic centimeter of lipiodol per minute, when injecting through the cystic duct. In cases in which there are no advanced anatomical changes, 3 or 4 cubic centimeters is injected, this is a sufficient quantity for studying the principal bile passages The injection is always made slowly—the screw on the stem of the piston belps to do this, the slowness of the injection and the action of Heister's valves, which neutralize all excess pressure, must also be relied upon With these precautions one can be assured that the hpiodol penetrates spontaneously the principal bile passages, thus making it possible to secure precise data regarding the anatomy and function of the excretory passages

During the injection into the cystic duct, into the middle third of which the point of the cannula is inserted, the bed of the gall bladder is examined as well as the distal third of the cystic duct and the junction of the ducts. The presence of an abnormal bile duct or of a solution of continuity produced during the operation is recognized by the escape of drops of lipiodol. It is logical that, when the common bile duct is visibly dilated, or when there are evident signs of obstruction, the nature of which is to be determined, to to 15 cubic centimeters of lipiodol is injected, the same quantity is used when the injection is made into the gall bladder.

Technque of verification To verify the condition of the bile passages, we find out if, after removing the stones in the bepatic and common bile ducts, their eremain overlooked calculi. For this purpose, after a T tube is inserted in the common bile duct and the choledochotomy opening is narrowed, a quantity of liptodol, depending on the capacity of the bile passages, is injected through the T tube. It should be remembered that the object is to see the entire extent of the bile passages, extrabepatic and intrahepatic. I based in the properties of the prodol after the stones have been extracted from liptodol after the stones have been extracted from

the common bile duct, in patients with jaundice and in a delicate condition, without the least ill consequences.

Rocattenegraphy In my service, a high tension cable is brought from the X-ray caboet to the operating theater. The Coolidge tube is placed on an L-shaped support, movable in all directions, or a portable apparatus may be employed. The patient is placed on the Potter Bucky diaphrag and is covered with a stenic sheet (Fig. 9).

All instruments that might intervene between the tube and the film are removed Generally 2 roentgenograms are sufficient with an interval of 10 to 15 minutes between exposures, sometimes only one is enough. To obtain a clear image, absolute immobility of the right hypochondrium is essential-this can be secured because of the fact that the patients are operated upon under local anesthesia In this way, without loss of time, the radiologist takes the roentgenograms he finds necessary, they are developed in the laboratory close by, the films are examined immediately on a roentgenogram illuminator in the operating theater, and the operation is proceeded with in accordance with the findings in the roentgenograms

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EDITORIALS

SURGERY Gynecology and Obstetrics

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NOVEMBER, 1937

FRACTURES OF THE NECK OF THE FEMUR

HE treatment of fractures of the neck of the femur has entered a new era Two factors are responsible for this (1) the use of the lateral x-ray and, (2) the use of internal fixation Lateral x-ray views have taught us that certain of the so called impacted fractures are not impacted at all but are in distinct malposition and are even overlapped Thirty years ago Whitman showed that bony union could be obtained in the majority of cases, but the long fixation in a cast, an essential part of the treatment, meant a tedious and confining convalescence that led to stiff knees and hips discouragingly slow to respond to treatment. Internal fixation shortens the period of immobilization and stiff joints cease to be a problem

Smith-Petersen's paper, wherein be advocated nailing the fragments with a triple flange nail, was not published until he had a sufficient number of proved good results to

show that internal fixation was feasible, practical, and safe He originally advised opening the hip joint, a formidable operation but one necessary in inserting a nail unless some means is used to determine definitely the proper line for such insertion. Various instruments and gadgets have been devised to determine the line of insertion, but a practical and accurate method is the threading and insertion of a cannulate nail or lag screw on a guide wire, the position of which has been previously determined by anteroposterior and lateral x-ray films. This renders exposure of the joint unnecessary

However, even if the mechanical requirements of reduction and fixation are fully complied with, there is still a "nigger in the wood pile," so to speak This has to do with the blood supply of the head of the femur It has been shown that the blood supply of the head of the femur is in a large measure carried to it by the artery which comes from the internal obturator vessel and finds its way beneath the cotyloid ligament to the ligamentum teres and along it to the bone But. unfortunately, in approximately 20 to 25 per cent of adults this blood vessel is either lacking or is so minute that it fails to deliver enough blood to be of any use This explains the atrophic changes, with flattening and distortion of the head, in a certain percentage of cases following perfect reduction, fixation, and even the attainment of bony union Such changes develop 6 months or a year after union, and nothing can be done about it because there is no way of knowing beforehand whether or not this blood supply through the ligamentum teres is present or not While it is true that femoral beads without this blood

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supply will unite to the neck of the femur in a fair percentage of cases when the fracture is correctly reduced and held in place, nevertheless such a faulty blood supply must account for a considerable percentage of non unions. The prognosis as to function in all fractures of the neck of the femur must therefore he guarded no matter how successful the reduction and fixation. It takes at least a year to determine whether or not atrophy of the head will develop

MELVIN S HENDERSON

VISION IN SURGERY

TECHNICAL skill in diagnosis and treatment is usually admitted as a virtue of specialism Much of the emphasis in training for specialists in surgery is laid upon the development of unusual dextenty in manipulative and mechanical methods for arriving at the patient's exact condition and for his relief However, there always arises incidentally, or should arise, a special kind of perception by means of which the really skillful surgeon can accomplish more by understanding the possibilities of improving his patient as well as hy carrying out the details of his diagnosis and surgical care. In a patient with infantile paralysis, for example, the prevention of deformity as well as opportunities for the later use of weakened limbs should be appreciated Braces and surgical operations for the stabilization of flail joints must be understood to make surgical plans for the patient's future This applies not only to the specialist hut to any physician or surgeon examining such a child, so that even if such treatment is not suggested it will at least not he neglected or criticized through lack of understanding The failure to understand these possibilities often results in a refusal of

such treatment and patients drift about from one practitioner to another or fall into the hands of irregulars and quacks hecause correct treatment has not heen suggested or ex plained

By combining an unusual initial insight into the patient's possibilities with the other attributes of specialists it is possible to arnve at a certain kind of successful result not obtainable otherwise for many surgical conditions

This phase of the functions of a specialist is not generally appreciated. It is not always employed by the specialist himself. The true surgeon should perceive in the patient as be presents himself certain possibilities that are not discerned by the average practitioner or by the madequately prepared surgeon who assumes a specialty for which he is immature. One may illustrate by taking the matter of an x ray plate-the x ray diagnostician reads a plate not strictly according to the contents of the film itself but according to the training and experience which he puts into the reading One sees on an x ray plate not actually what is there, but what he has been trained to see or what his experience in x ray reading enables him to distinguish with the plate before him Accordingly, the patient obtains from his x ray diagnostician a reading which does or which does not lead to correct diag nosis and treatment as far as the xray diagnosis is concerned

It is exactly so in observing patients The inadequately trained surgeon sees in the patient as he presents himself not necessarily the possibilities that actually exist, but only those possibilities which his training and experience enable him to perceive

Criticism of specialists by general practi tioners often arises in this way. The general practitioner has been able to see neither the patient's condition in its true light nor the

possibilities for remedy or relief. In arthritis, for example, practitioners generally and even medical and surgical specialists without expenence in the mechanical prevention of deformity or its surgical correction, sometimes fail to recognize possibilities for the prevention and cure of deformity that would save much permanent disability. The same comment applies with even greater force to the secondary treatment of fractures in patients with poor results following primary treatment Failure to comprehend the patient's actual condition and his possibilities he along with an unfamiliarity with the technical methods

by which the treatment is to be carried out and ultimate results are to be obtained

Those surgeons of experience and training who look upon their specialty as one in which fairly accurate mathematical degrees of diagnosis may he made and results obtained, are those who have the vision as well as the technical skill to apply to each prohlem all the methods essential for success. This constitutes the sort of surgical equipment that should characterize everyone who hopes to make a success of the practice of any specialty and of surgery in particular.

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Facsimic of letter from Dr. Charles McBumey to Dr. Lewis L. McArthur dated October 10 1894

LANDMARKS IN SURGERY

THE MUSCLE-SPLITTING OR GRID-IRON INCISION

FOR APPENDECTOMY

An Historical Note

SELIM W McARTHUR, M D, Chicago, Illinois

'N VIEW of the world wide adoption of the mus cle splitting abdominal incision as an approach for appendectomy, and in view of the numerous references in the current literature as regards the importance of this incision, in the lessened mortality rate, diminished period of hospitalization and freedom from postoperative hernias, a brief note of certain facts concerning the historical origin of this incision may he of interest

In the spring of 1894, Dr Lewis Linn McArthur of Chicago, made application to the secretary of the Chicago Medical Society for a place on the program at a regular meeting to present an original contribu tion by him concerning a new method of incising the abdominal wall, especially applicable to appen dectomies Originally, he was assigned a place on the June, 1894, program, but due to the length of the program, and the fact that his paper was the last on the list. Dr McArthur agreed on request to postpone his presentation until an early fall meeting of

In the Annals of Surgery1, July, 1894, appeared an article entitled "The Incision made in the Ahdominal Wall in Cases of Appendicitis, with a Descrip tion of a New Method of Operating" by Dr Charles McBurney, surgeon to the Roosevelt Hospital of New York In this article, Dr McBurney describes the typical muscle splitting incision as now so widely used He reports having used this method in 4 cases "of recurrent appendicatis," the first having been done on a patient on December 18, 1893, or about 6 months prior to this presentation of the method He qualifies his recommendation for the use of this method of incision by the statement, "This operation does not appear suitable for cases accompanied by suppuration about the appendix, which require extensive packing with gauze" And in conclusion remarks, "Sufficient time has not elapsed to justify me in presenting the final results as positively an improvement upon those obtained hy older methods "

On reading this paper in the Annals, Dr McArthur immediately wrote Dr McBurney on August 24, 1894, congratulating him upon his essay and enclosed a copy of his own paper on the same subject, which at the time had not been as vet presented

In reply, Dr McBurney wrote Dr McArthur a cordial letter dated October 10, 1894, apologizing for delay in answering hecause of absence from home and in this letter graciously acknowledges the fact of Dr McArthur's priority of use of this method of abdominal incision In addition, some years later, at a dinner in Chicago, given to Dr McBurney, he again publicly acknowledged the same to his Chi-cago colleagues This, of course, does not appear in The aforesaid letter from Dr McBurney was discovered in November, 1934, among the correspondence in the desk of Dr McArthur at the time of his death. This letter is now deposited at the John Crerar Medical Library in Chicago for simple historic interest, and for similar reason, there follows here a true copy of the letter

> Highgate Springs Vt October to 1804

My dear Doctor McArthur

any questions the state of August 24th has followed to the state of th thing entirely new and your letter to me is the first intimation I have had that the operation had even been done by anyone but But in these days when active clever workers are so nu memus the opportunities to devise anything entirely original are few and far between I think the operation has hardly heen appreciated even by those who have read the description-at least I have seen no comments upon it in the journals of my neigh borhood I think it is destined to supplant all other operations for the removal of the normal or of the chronically inflamed appendix. But who knows You ask me what my practice is in cases in which an evident abscess exists. Unless some contra cases in which an evident anscess exists. Uniess some contra indication easists I operate on them at once If possible I enter the abscess as near the outer edge of the abdomen as may be without opening up the general pertoneal cavity. The incrision in the wall of the abscess is made as large as is consistent without opening the general cavity. The cavity is then merely mopped opening the general cavity. The cavity is then merely mopped up to the contract of the contract of the cavity of the merely mopped of the contract of the cavity of the merely mopped that the cavity of the merely mopped that the cavity of the cavity is then merely mopped to the cavity of the cavity of the merely mopped to the cavity of the cavity of the merely mopped to the cavity of the cav longed search would be required to remove the appendix it is left to itself. The cavity is then moderately packed with iodoform gauze-I almost never use a dramage tube. If it is necesform gause—I aimost never use a drainage tune. If it is neces-sary to open the general cavity in order to reach a deep abscess the same method is applied only taking great care not to infect the numwholed perioneum. I should like to know more of your "extra peritoneal," method. Of course in abscess arising in the appendix can be opened without cutting peritoneum a peri-toneum forms the wall of the abscess If you come to New York I trust you will let me see With Lind regards

(Signed)

Very truly yours Charles McBurney

the society

Dr McArthur read his own paper before the regu lar meeting of the Chicago Medical Society on October 1, 1894 at which Dr Nicholas Senn, president, presided The title of the paper reads "Choice of Incisions of Ahdominal Wall, especially for Appendicitis," and it subsequently appeared in print in the Chicago Medical Recorder for November,

In prefacing his essay, Dr McArthur mentions the fact that Dr McBurney had already reported the same method, and that he, Dr McArthur felt, this in itself was adequate recommendation for the

In this paper, Dr McArthur draws attention to his having used the method in 50 cases, the oldest of these 3 years prior to this presentation. In con tradistinction to Dr McBurney's recommendation he advocates the use of this type of incision in all types of appendiceal inflammation, suppuration, and abscess formation And in passing, draws attention to the fact that similar principles of muscle fiber separation can and should be used in other areas of the body. In concluding his paper. Dr. McArthur sums up the recommendations for this method as having (1) less hemorrhage, (2) clear anatomy (3) least possible danger of hernia, (4) if necessary to enlarge the wound, only one layer of muscle need be sacrificed (5) less suturing, (6) patient need not be as carefully confined to one position, (7) less

The minutes of this meeting of the Chicago Medi cal Society signed by Junius Hoag, secretary (now deposited at the Chicago Historical Society) show the paper was discussed by Drs John B Murphy Alex II Ferguson, Arthur Dean Bevan, and Samuel

Plummer An important item, apropos of the historical in terest is the statement at the time of Dr E Willis Andrews, that he has used McArthur's method for several years with great satisfaction, and he was greatly impressed with the self closure of the muscle layers, so that frequently he had not inserted a sin

gle suture in them on closing the abdomen In conclusion, Dr McArthur during the last years of his life, frequently expressed the opinion that this method of muscle fiber separation had been a real contribution to surgical technique from the stand

point of mortality and morbidity

CORRESPONDENCE

CONGRESS OF UROLOGY, BUENOS AIRES, ARGENTINA

ROM November 28 to December 4, 1037, the Second American Congress and the First Argentine Congress of Urology will be held in Buenos Aires The subjects for discussion are gento urinary hydatidosis, genital tuberculosis, urography of excretion, and endoscopic surgery of adenoma of the prostate The president of the Congress is Professor Dr Bernadino Marain, Santa Fe oro, Buenos Aires

SOME OBSERVATIONS ON ORTHOPEDIC SURGERY IN EUROPE

IN THE editorial appearing on page 1004 of the June, 1037, 1881e of SURGERY, GYNECOLOGY AND OBSIETAICS, Dr. Ralph Ghormley attributed an operative procedure for the treatment of fractures of the neck of the femure to Dr. Faldium of Parma

The credit for this procedure should have been given to Dr Ettorre of Milan Dr Ettore first proposed subtrochantenc osteotomy for the treatment of fractures of the neck of the femur in old people in 1933 at the congress of the German Orthopedic Society At the last congress of the International Orthopedic Society, to which Dr Ghormley referred, it was Dr Ettore, and not Dr Faldini, who made the presentation of the patients operated upon by this method

CARCINOMA OF THE COLON-A CORRECTION

IN THE article entitled "Carenoma of the Colon" hy Moses Behrend, the last sentence in the paragraph on anesthesia appearing on page 513 of the October, 1937, issue of Surcesey, Gunecota AND Obstetrics should read "In somewhat over 3000 cases I have never had a death following the use of neocaine"

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

THE authors state that they have published their book Carcinoma of the Female Genital Organs, of some 215 odd pages because of the lack of any 'work fully illuminating the question of carcinoma of the female sexual sphere Mahnnusky and Quater have obtained the contributions of some o other specialists in various branches of medicine to make it a more comprehensive work. The opening chapter is a general discussion of the pathogenesis and etiology of tumors under three main heads namely inciting predisposing and accessory factors The authors discuss clinical and experimental data concerning the controversial question of "precan cerous condition of tissue They also point out the significance of the chronic irritation theory by virchow in the development of tumors and confirm the fact that they may develop from implantation of embry onic tissue as stated by Cohnheim The van ous and sundry irritants are discussed with their relationship to tumor development and the state ment is made the duality of the nature and etiology of tumors 1- beyond any doubt" They feel that beredity does have some influence on the appearance of tumors

The next two chapters deal with the pathology and clinical proture of carcinoma of the uterus and mammary gland. The authors stress the importance of the classification of uterine carcinoma into cervical or that of the vaginal portion endocervical or that of the easil, and that of the body or fundus of the uterus because of the differences in rate and type of growth and metastases although they state that for clinical purposes they divide only into twn groups of the error and carcinoma of the body corchoma of the error and carcinoma of the body corchoma of the error and carcinoma of the body carcinoma of the error and carcinoma of the body carcinoma of the error and carcinoma of the body carcinoma of the exception of the development of various ages and symptoms in the other.

In chapter four the authors present more rarely observed forms of carrinoma of the female gental organs such as that of the ovaries, fallopian tubes vulva and vagina including the krukenberg's tumor. In the following chapter the question metastases of carcinoma of the nyary is covered in

Chapter are covers the surgical treatment of car canoma of the uterus giving several illustrations of technique and discusses different methods of treat ment including the Wertheim abdominal approach in the next chapter the authors discuss the treat ment of carcinoma of the uterus with radiant energy, annely radium and roentgen ray, and hing nut the varinus factors involved in the comparison of this method with surgical procedures. Chapters eight and nine bring out the various proposed methods of treatment in inoperable carcinoma, including the u enf calcium salts.

Chapter ten is a discussion of carcinoma of the mammary gland including diagnosis, treatment, and prognosis. The authors stress the importance of differentiating between benign and malignant le

In the final chapter the authors discuss carcinoma of the female sexual sphere in its relationship to economics and disability, and more specifically in its relationship to the insurance problem

BYFORD F HESKETT

IN this relatively small text,2 Dr Carter, one of I the younger cardiologists of Chicago has at tempted the difficult task of presenting the extensive subject matter of electrocardiography A portion of the original material for this book which has been amplified by the author, was published in the Journal of American Medical Association a few years 250 On the whole the book is somewhat too complicated for the heginning student of electrocardiography, and not sufficiently extensive for the trained cardiologist The large number of electrocardiograms is representative although many of the cuts are too small The bibliography is rather well selected One might question some of the author's terminology particu larly the matter of right and left bundle branch block which is not in accord with the conclusions reached by the authoritative American Heart Association, Another point of disagreement is the matter of ventricular preponderance The book has a number C C MAHER of satisfactory points

THE first valume of Weibel's Praumheilstande is a complete textbook on obstetnes of 679 pages. The volume is very profusely illustrated with black and white as well as some unusually fine colored illustrations, and many clear roentgenograms some of which have been advantageously retouched. The subject matter is sound and is presented in a direct concise manner reflecting the extensive knowledge and long teaching experience of the author. The hink is printed in good stock well suited to the libs tratinns, in Clear type interspersed with bold type fur key words and headings. An adequate and complete index is appended. The reviewer anticipate

The Fundamentals of Electrocardiography Interpretation By J Bully Carter, M D. With a foreword by Horsto but William M D. Spreighed III and Baltmort Md Charles C. Thomas 17, "LENDARD THE DEATH OF THE PROPERTY LEVEL BY THE PROPERTY LEVEL BY CARRESTIATION. By Prof. Dr. W. West, 1961.

¹CARCINONA OF THE FEMALE GENTIAL ORGANS By M C Malmowrky and E Quat r Translated from the Russian by A S Schwartzmann, A B M.D. Boston Bruce Humphires Inc 1936

with pleasant expectancy the appearance of Weibel's companion volume, devoted to gynecology work is recommended to all students and practi-IRVING F STEIN tioners of obstetrics

IN Arthur E Guedel's Inhalation Anesthesial we L have at last a very practical guide for the student in anesthesia and for the experienced anesthetist Dr Guedel's principles of inhalation anesthesia have heen used by many of us for years, the signs of anesthesia, as outlined by him, have been of maximum importance in guiding us through trying anesthesias

This manual is practical, basic in its principles, concise, and brief in its delivery. It is hoped that Dr Guedel will continue in his writings to give us the much needed complete text and reference book MARY KARP

in anesthesia

TT is impossible in the present stage of our knowl I edge of endocrine physiology to do more than sketch the outlines of the subject, but a helpful, well documented presentation in one volume of clinical endocrinology is made by Werner in his recent hook 2 Necessarily the extent of the field covered makes the discussion of many subjects quite superficial Any one of the many syndromes is worth a hook in itself Terms remain in use that the immediate future will disclose as inaccurate or misleading Treatment is unsatisfactory and there is still the tendency to confuse the course of natural development with thera peutic results. A great amount of the material in such a book at this time must be regarded as con troversial The discrepancy between physiology and clinical medicine is painfully apparent in such an understanding After a good discussion of the physiology of the pituitary, for example, the author describes so called hilobar pituitary disorders The diagnosis at present is based on clinical interpretations rather than physiological tests. The confusion is twofold in that the clinical characteristics are of unknown origin, but they serve as the basis for a diagnosis which, in itself, seems to be a pure hypoth Nevertheless, in spite of these difficulties which are at present inescapable, the volume is valuable, worth studying, and suggestive

PAUL STARR

MAGNIFICENT monographs on ovarian func-A MAGNIFICE NI monograph.

A tion is that of Kehrer The contents may be out fined as follows (r) hiologic endocrinologic fundamentals, (2) physiologic amenorrhea, (3) pathologic amenorrhea, (4) the problem of ovarian function in monoglandular endocrine pathology, that is, (a) ovary, (h) diencephalo adenohypophysis, (c) pineal gland, (d) thyroid, (e) parathyroid, (f) thymus, (g) liver, (h) spleen, (1) pancreas, (1) adrenal, (5) the

NUMBERTON AVERTHER A FROMMENT GUME. By Arthur E Good M D New York The Mannalian Co 1909. By Arthur E Good Notice of the Numbert Control of the November of the Number of t

problem of ovarian function in highandular and plunglandular diseases, (6) the problem of ovarian function in infantilism, (7) the problem of ovarian function in status lymphaticus, (8) the problem of ovarian function in spasmophilia, (9) the problem of ovarian function in obesity, (10) the problem of ovarian function in malnutrition, (11) the problem of ovarian function in systemic diseases, (12) the problem of ovarian function in skin diseases, (13) psychorenic amenorrhea, (14) ovarian function in psychoses, (15) ovarian function in central nervous system diseases, (16) results of failing ovarian function, especially chimacteric and castration, (17) diagnosis of cause of amenorrhea, (18) prognosis in amenorrhea, (19) therapy of various forms of amenorrhea, (a) roentgen therapy, (h) surgical therapy, (c) hormonal therapy

Each of these sections has several subheadings. each is considered in detail, constant reference to the literature is made There are 50 closely packed pages of bibliography An index is provided

Needless to say, this volume will serve as a valuable reference work and an immediate aid to the gynecologist and endocrinologist PAUL STARR

POSTOPERATIVE and especially pre operative care are too frequently neglected despite repeated reference to the subjects in current journal articles A new work by Dr Robert L Mason and collabo rators provides excellent reference material on this subject. The reason for this seeming neglect may he in the fact that the medical student is taught the fundamentals of the diagnosis of a specific lesion and how to treat it but unfortunately he is not taught, or at feast it is not impressed upon him, that he is dealing with a living organism that responds as a whole and that sundry essential organs may be affected both hy the lesion and its associated physiologic dysfunction, and the stress of the surgical procedure It is of vital importance that such states as dehydration, anemia, disturbances in the acid base balance. starvation, and the like he corrected if possible hefore any major surgical procedure is attempted Coller and his co workers have contributed an invaluable service in their detailed studies on water halance and if their advice is followed many crises may he averted and much postoperative distress can he prevented

In the preface to his work, "Fundamentals of the Art of Surgery," Watson stated "Today many operations seem so simple that the technical skill should he within the grasp of any man who can use his hands with any degree of dexterity at all, and all that is necessary is to learn the steps of the operation and forthwith go and do likewise. This is a false assumption, which has been proved to be so over and over again The success of an operation depends on much more than this, it entails first a careful and thorough examination of the patient,

PRE-OPERATIVE AND POSIOPERATIVE TREATMENT BY Robert L Mason AB F-ACS Philadelphia and London W B Saunders Co

second, an adequate pre operative preparation, third a careful anesthesia fourth, the proper organization and equipment of the place for the operation fifth a due appreciation of the powers of the patient and his ability to stand the strain to be imposed upon him such adequate facilities for postoperative treatment and last directions for the after care of the patient. The more one sess of practical surgery the more one is impressed by the relative frequency of unforcessen complications, and when one carefully thinks out the cause of these troubles it is only to find that most of them could be presented. This was written over 10 years ago yet bears repeating again and forms much of the basis of Vasons work.

The pre-operative study of the patient from the standpoint of the operative risk including heart disease hipertension nephritis, diabetes, and the like is discussed. Postoperative shock acidosis and alkalosis ileus acute dilatation of the stomach de highation pulmonary and unnary complications, parotitis thrombosis pentonitis and the like are taken up. It is interesting to note the high percent age of serious lung complications reported from their mistitution. At the close of Part I there is morpio

rated a very instructive article on superficial hums. The wisdom of devoting 30 pages to this subject, which is a well recognized surgical entity, in a work on pre-operative and postoperative treatment may be questioned, this especially in view of the fact that only 4 pages are devoted to shock and its manage most.

The Bart II the author discusses the pre-operative and postoperative care of the patient from the view point of regional surgical conditions and operations. This part like the first, dividing the presentation is still entirely as the presentation in growth of the presentation is good and the text is well illustrated and easily read. One may question the advice as to re-operation in the presence of post operative bemorrhage after gastine surgery. A blood transfusion objustes this necessity in the majority of cases and eliminates the danger incident to an operation.

The final impression left by this work is that it will find a great field of usefulness in the hands of the interne resident, and young and inexperienced surgeon. Its conciseness and brevity are added attractions.

BOOKS RECEIVED

Books received and acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender Selections will be made for review in the interests of our readers and as space

Debative Observates a Guide to the Difficulties and Complications of Destruce Paractice By J M Munro Kerr LLD M D, FCDG 4th ed With the Assistance of Donald McIntyre M D FCDG and D Fyle Anderson M D Baltimore William Wood & Co

THE POSTMORTEM EXAMINATION By Sidney Farber M D Springfield III and Baltimore Md Charles C

Thomas 1937 Lax Book or Radiology Diagnosis fidited by Charles A Waters MD Associate Editor Whitmer B Firer VI D THERAFEUTICS Edited by Ira I Kaplan B Se MD Cheago The Jear Book Publishers

Post Graduate Surgery Edited by Rodney Maingot FRCS (Eng.) Vol 3 New York D Appleton Century Co Inc. 1037

THE ROENTGENOLOGIST IN COURT By Samuel Wright

Donaldson AB MD FACR Springfield, Ill, and Baltimore Md Charles C Thomas, 1937

THE THINKING BORY A STUDY OF THE BALANCING FORCES OF DYNAMIC MAN By Mable Elsworth Todd Foreword by E G Brackett M D New York and London Poul By Manda Poul

don Paul B Hoeber Inc., 1937
PSEUDOCYESIS By George Davis Bivin Ph D and M
Pauline Klinger M A Bloomington, Ind The Principla

Press Inc 1917
Overous Medical Publications The Abbominal
Surgery of Children By Sir Lancelot Barington
Ward A C V D Ch M FR C S (Eng)
2d ed London Oxford University Press 1937 We con-

ad ed London Oxford University Press 1937
The Physiology of the Kinney By Homer W Smith,
B Sc.D M.S (Hon) New York Oxford University

Press 1937
Oxford Medical Publications The Management
Of the Preumonas for Physicians and Medical
Stidents By Jesse G M Bullows B A M D New
Josh Oxford University Press 7937

Synopsis of Genitourinary Diseases By Austin I Dodson MD FACS 2d ed St Louis The C

Mosby Co 1937





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SURGERY

GYNECOLOGY AND OBSTETRICS

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THE PRIMARY POINT OF INFECTION IN TUBERCULOSIS OF THE HIP JOINT

C HOWARD HATCHER, M D , and DALLAS B PHEMISTER, M D , F A C S , Chicago, Illinois

UBERCULOSIS of the skeleton practically always arises as a result of hematogenous spread of the disease from primary foci in other regions In children, the primary tuberculous infection is usually in the lung and the tracheobronchial lymph nodes but sometimes the primary site is in the intestine and mesenteric lymph nodes or elsewhere In adults, skeletal tuberculosis may in some patients develop by hematogenous spread of bacilli from an old primary complex of childhood, but more often there is evidence of an active or arrested adult type of pulmonary lesion. In this clinic, for example, 36 patients with skeletal tuberculosis which started in adult life showed roentgen evidence of active pulmonary tuberculosis in 14, probably mactive fibrotic or calcified lung lesions in 9, calcified primary infections in 6, and no evidence of pulmonary tuherculous infection in 7 A joint in a relatively small percentage of cases becomes secondarily involved by extension from tuberculosis of surrounding structures such as bursæ, tendon sheaths, and other Tuberculous bursitis about the hip. the knee, and in the hand has been known to involve the adjacent joints and tenosynovitis of the hand and foot has extended to the neighboring joints Tuberculosis of the tarsal and carpal joints frequently spreads to other

From the Department of Surgery The University of Chicago

neighboring joints as, for example, subastragalar tuberculosis which involves the ankle by direct extension or tuberculosis of the proximal tibiofibular joint which gives rise to infection of the Lnee In the great majority of cases, however, the joint becomes involved by organisms that localize from the blood stream either in the synovia or in the neighboring bone The location of the primary point of involvement of the joint structure is variable When the primary focus is in the bone, it may be either in the epiphysis or in the diaphysis There exists as yet no accurate estimate of the relative frequency with which the synovia, epiphysis, and diaphysis are primarily involved and there is variation in relative frequency of primary involvement of the various joint structures according to age and the joint under consideration

This study is concerned with the primary promoted involvement of the hip joint in tuber-culosis beginning in both childhood and adult life. Either the synovia or the innominate bone or the upper end of the femur including the capital and troclianteric epiphyses and their metaphyses may be the primary site. A few instances in which tuberculosis of the gluteal and ilhopsoas bursæ has spread to involve the hip joint have been reported. Evidence as to the primary site of the joint disease may be obtained by means of roentgenological and

pathological examinations The great advan tage of the roentgen ray is that it can be employed early in the disease at which time it may disclose the primary focus, if osseous and subsequent examinations may show the extension to other structures of the joint Pathological examination on the other hand max disclose primary synovial involvement or small osscous foci which are not recognizable in roentgenograms As the disease advances and bone destruction progresses, it usually becomes increasingly more difficult from a single roentgenological or a pathological examination to determine accurately the primary point of involvement of the joint structure Exten sive bone destruction about the joint may be due either to increase in size of the primary bone focus or to secondary involvement by extension from the tuberculous arthritis. In advanced cases it is often impossible to determine the primary point of infection. It is sometimes true that a greater extent of in volvement of the bone on one side of the joint results from primary localization in that bone but more frequently extensive bone destruc tion is the result of secondary invasion from the joint

The material studied in this report compines 82 case reports of patients who suffered from tuberculosis of the hip. In 70 of them the disease began in childhood and in 12 it began in adult life. The studies were made at extremels variable times after the onset of the disease and extended over variable periods of time in each case. This made a great deal of individual difference in the accuracy with which the primary point of infection could be determined. Also it should be borne in mind that the treatment varied considerably in the individual cases, which accounts for some of the variations in the pathological and roent genological pictures obtained.

PRIMARY POINT OF INTECTION OF HIP JOINT IN CHILDHOOD

Primary obseous lesions of tuberculosis were more often seen about the hip in children than in adults. The reason for this is probably that during growth the bones about the joint receive a proportionately larger blood supply than is the case after growth has cessed. An other factor is the existence of end arteries in the metaphyses, as has been demonstrated hy Nussbaum (2). From the standpoint of pri mary localization, the 70 cases of hip joint tuberculosis which occurred in childhood are grouped as follows.

weation	No of cases
veck of femur	14
lorn,	13
schum	2
apital femoral epiphysis	0
Incertain	44

Primary focus in the femur The juxta epipby seal region of the neck of the femur was the most common site of primary oxeous in volvement in the series Many of the lesions broke into the joint early but others appar ently remained localized in the femoral neck for a relatively long time. Sometimes sain cient growth took place at the capital epi physeal cartilage to bring the focus into the distal portion of the neck or the intertrochan tene remon Seven of the 11 patients were seen before there was dennite chinical or roent genological evidence of joint change. Repeated roentgenograms over a period of time, how ever, showed dennite changes in the articular surfaces in all except 2 of the patients The following case reports illustrate the primary focus in the neck with secondary arthritis

CASE 1 D M female aged 7 years had pain in the hip for 6 months and on examination had very slight limitation of motion. Figure 1 a shows an area of rarefaction in the inferior juxta-epiphrecal region of the neck. The inferior cortex of the neck is eroded and a slight shadow of supernotal new bone is present. The shadows of the bony articular cortices of the head and acetabulum are intact and the carti lage space of the joint is of normal width. Immobili zation of the extremity in a plaster hip pica ca.t with bed rest and a general anti tuberculous regimen There was improvement in the were carried out patient's general phy ical condition and a roent genogram (Fig 1 b) taken 4 months after entry shows signs of healing of the primary osseous lesion liter 7 months however the child was losing weight and there were daily temperature rises to 35 to 35 s degrees C The roentgenogram which was taken at this time (Fig 1 c) shows dennite pread throughout the joint as evidenced by the loss of shadows of the bony articular cortices of the femoral head and acetabulum Marked atrophy of the bone almo t obscures the primary metaphyseal lesion. At opera tion a tuberculous synovitis was found. The articu lar cartilages were extensively eroded and loosened from the underlying bone. In the inferior region of

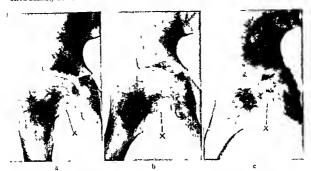


Fig 1 Case 1 Primary focus of tuberculosis in the neck of the femitr a taken 6 months after ooset shows an area of reduced density a in the inferior juxta cipphyseal rigion of the femoral neck—the stadows of the bony articular cortices and the articular cartilage space are normal, b, taken 4 months later, shows evidence of sight healing of the osseous focus with still no evidence of joint destruction, c, taken after 7 months, shows marked regional atrophy loss of the shadows of the bony articular cortices, and a narrowed articular cartilage space, the primary neck focus is indistinct because of marked atrophy

the neck there was a cavity i centimeter in diameter which extended through the epiphyseal cartilage and into the capital epiphysis. Excision of the articular cartilages of the hip joint, curretage of the focus in the neck, and arthrodesis by full thickness tibial bone transplants were done. A sinus followed operation, the transplants had to be removed and it vear later.

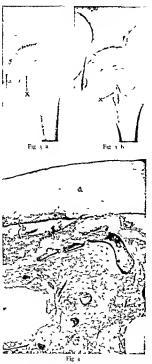
there was still no bony ankylosis but also no further spread of the disease

CASE 2 A K, male, aged 7 years, had pain and limp in the right hip for 2 years. The hip joint was freely movable. Figure 2, a, shows a large area of reduced density in the messal portion of the neck. The cartilage space and the shadows of the bony



lig 2 Case 2 Tuberculosis of the hip primary in the neck of the feitur a, shows area of reduced deosity, z, in the messal portion of the metaphysis a shight shadow of overlying periosteal bone, intact shadows of the bony ar tudiar cortieve and the normal cartilage space of the joint b taken 11 months after curettage shows booy repair of the osseous focus, c, taken 2 years after operation, shows

further healing of the primary focus but there are narrowed articular cartilage space an irregular loss of the shadows of the bony articular cortices, and a lateral erosion of the capital epiphysis which indicates tuberculous artifarities, of taken 8 months later, shows shight flattening of the capital epiphysis and slight sclerosis about its lateral area of erosion



articular cortices show no change. Because of the ab ence of definite evidence of general much ement of the joint operation to eradicate the primary bone lesson was done. The neck focus was tunnelled into laterally from beneath the greater trockanter and



Ing 3 Case 3 Toberculous of the hip primary in the femoral metaphysis a taken 6 months after onest, above a rangular area of reduced density - re-cully in the rick a normal cardiace; pace of the point and normal shadows a displacement of the primary metaphysis of the shows displacement of the primary metaphysis of the shad ones of the control to the messal portion base of the neck and distended captal exphisiss of taking months after, shows loss of the shad one of the bony articular cortices and marrowed strictly actually to the control to the control of

point.

The 4 Case 3 Photomicrograph showing necrotic at ticular cartilage a undermined and invaded by subchodral non-yeeine granulation tiss we b which has about the bony articular cortex and the subchondral cancellous lone (%₂).

tuberculous granulation tissue was curetted out with out opening into the joint A plaster dressing has now been worn for 3 years and 4 months since opera tion Figure 2 b taken rs months after operation shows repair of the neck le ion and still no signs of general joint destruction. However at 18 months there was some irregular destruction of the bony articular cortices and narrowing of the articular carti lage space indicative of a spread into the joint A roentgenogram taken 2 years after operation (Fig 2 c) shows further narrowing of the cartilage space and erosion of the lateral non-contacted portion of the head of femur Two years and 8 months after operation (Fig 2 d) there is evidence of slight flat tening of the head and sclerosis of the margins of the destructive areas on its lateral and me ial portions. Despute fairly early surgical eradication of the neck focus the hip joint later showed signs of progressive involvement by the tuberculous process.

CASE 3 J G aged 4 years had pain and limp in the left hip for 2 years Examination showed marked muscle spasm Figure 3 a, taken 6 months after

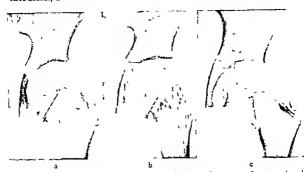


Fig 5 Case 4 Primary oseous focus in the femoral neck a shows a central juxta epiphyseal region of reduced density x, but no evidence of joint involvement, b, taken after 17 months, shows distal extension of the primary focus in the neck, c, taken after 33/5 years, shows an almost healed neck lesion and an intact joint

onset shows a triangular area of reduced density in the mesial one third of the femoral neck with its base bordering on the epiphyseal line. The cartilage space of the joint is of normal width and the shadows A roentgenoof the articular cortices are intact gram taken on admission (Fig. 3, b) 1/2 years later shows continued growth of the femoral neck with displacement of the focus to the mesial portion of its base and blotchy increase in the density of the focus indicative of bony repair. The head shows signs of flattening but there is little if any narrowing of the cartilage space or reduced density of the articular cortical shadows Biopsy of the synovia showed tu berculosis by microscopic and guinea pig tests Treatment consisted of plaster encasement for 11 months and 3 weeks despite which there was progressive destruction of the joint The sclerosed area of primary involvement in the neck had been further displaced Figure 3, c, shows the loss of the shadow of the articular cortices and narrowing of the cartilage space after 7 months, and Figure 3, d, shows the loss of bone in the head and thum along the upper portion of the joint 5 months later Operation was then performed. There was extensive tubercu lous synovitis. The head was flattened and reduced in size and its articular cartilage was largely intact but loosened The joint was resected including the small head and underlying epiphy seal cartilage disc, and whole thickness tibial bone transplants were in troduced \ microscopic section (I ig 4) of the head shows the articular cartilage to be necrotic and un dermined by granulations consisting of round cells. fibroblasts and some necrotic debris, but containing no tubercles The bone in the epiphysis had been extensively worn down from the surface but the re

maining deeper portion to the epiphyseal cartilage disc was alive and showed no sign of tuberculous invasion

In regions other than the hip, healing of a metaphyseal or diaphyseal focus of tuberculosis without joint involvement is observed occasionally Foci in the distal femoral and the tibial metaphyses have been observed to heal spontaneously or after surgical eradication, leaving the neighboring joints uninvolved In spina ventosa, the adjacent joints are rarely involved and healing is usual. At the hip, however, metaphyseal lesions which are large enough to be recognizable in roentgenograms usually spread to the joint Approximately two thirds of the femoral neck is separated from the joint by only the thin covering of periosteum and reflected capsule so that infection in the neck can readily gain access to the joint The common marginal localization of the primary focus in the metaphysis also favors extension into the joint In 2 patients the central location of the lesion. which healed without progressive joint involvement, was probably of importance in the sparing of the joint Spontaneous extracapsular drainage of the tuberculous abscess in I patient was also probably a factor in keeping



of the femur with sparing of the joint a shows a central area of ratefaction x in the neck a flattened and irregular expital epiph, us of greater density centrally than peripher ally and a shadow of slight periosteal bone formation lat stally on the femoral shaft b taken o months later shows dit tal extension of the metaphy seal focus and loss of

the joint free of tuberculosis. In the following case a central juxta epiphyseal lesion of the femoral neck healed without evidence of ar thritis.

CASE 4 R L male aged 5 years had pain in the left hip for a months associated with night cries Examination showed unre tricted motion at the hip A skin tuberculin test was positive to 1 1000 old tu Figure , a shows a central juxta epi physeal area of reduced density in the neck meta physis. The articular cartilage space is undiminished and the epiphysis is of normal contour and den ity Treatment consisted of immobilization in plaster dressings for a years A roentgenogram taken after 17 months (Fig 5 b) shows some distal extension of the focus in the neck but there is no evidence of gen eral involvement of the joint Three and one half vears after the first examination there were no symp toms and free motion was present at the hip Figure o shows the intact joint and slightly widened fem oral neck with small areas of rarefaction which represent the almost healed focus which has become displaced downward in the neck by growth from the capital epiphyseal disc

Since there was no tissue examination in this case, the diagno is of tuberculous was not proved. The symptoms po inve tuberculin test, and roentgenographic characteristics of the lesion, however, make a diagnosis of tuberculous to far most likely.

The following case is one of proved meta physeal tuberculosis in which roentgenograms taken over a period of 7 years showed no progressive destruction of the joint, and biops, showed no tuberculous sy novitis Epiphyseal and there is partial lateral dislocation. I taken 7 years after the onset of symptoms above a fattered apaid graphysis of uniform density and bony repair of the primary neck focus.

changes were present and were indicative of either extension of the tuberculous infection.

capital epiphs ais is flattened but is more regular in contour

changes were present and were indicative of either extension of the tuberculous infection to its bony center or possibly interference with the blood supply followed by necrosis with subsequent regeneration

CASE 3 T C female, aged a years had pain in the left hip for 4 months Examination howed ten derness about the hip hut motion was only slightly restricted A piration of the joint vielded no fluid Figure 6 a shows a large central area of reduced density in the femoral metaphysis which borders on the epiphy seal cartilage and extends down the neck to the intertrochanteric region. The bony center of the capital epiphysis is irregular and flattened and of greater density centrally than peripherally cartilage space of the joint is of normal width. A shadow of slight periosteal bone formation is present on the lateral aspect of the femoral shaft A diagnosis of tuberculous focus in the femoral metaphi-is with secondary involvement of the bony center of the head was made and plaster immobilization of the hip joint was carried out for 7 years. After 6 months a cold above-s was found to be pre ent anteriorly in the thigh and this spontaneously opened just above the knee Guinea pig inoculation showed tuberculosis, and granulations from the sinus were micro-copically A roentgenogram (Fig 6, b) taken tuberculous. after 20 months shows extension downward of the metaphyseal lesion to the lower level of the lesser trochanter and extensive loss of the bony shadow in the femoral head There is no narrowing of the car tilage space of the joint and the cortex of the ace tabulum shows no change. There is slight lateral displacement of the head of the femur roentgenogram (Fig 6, c) taken 312 years after the

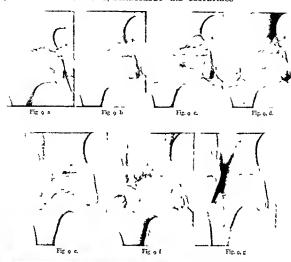


Fig 7 Case 6 Tuberculosis of the hip primary in the need of the femure a, shows a diffuse area of rarefaction x, in the metaphy is which contains smaller shadows of bone of greater density than the surrounding atrophic bone a slight loss of the shadow of the bony articular cortex at the lateral margin of the femoral bead but an undiminished cartilage space of the joint, b taken i year later shows non union of the tibial transplants to the femur and partial healing of the neck focus, c taken 2 years after the second transplant was done, shows solid fusion of the joint and healing of the neck focus

first examination shows evidence of marked healing of the metaphyseal focus. The honv center of the epiphysis is flattened but is more regular in contour and the central area of rarefaction is decreased in size in comparison with the previous roentgenogram The hip is partially dislocated but there is no roentgen evidence of progressive tuberculous involvement of the joint Biops) of the hip joint was then per formed The articular cartilages were grossly normal Microscopically the synovia showed no evidence of tuberculosis and guinea pig inoculation was negative Seven years after the onset of symptoms the hip



Fig 8 Case 7 Tuberculosis of the hip primary in the neck of the femur a shows area of bone absorption x in the inferior region of the neck surrounding the sequestrum, erosion of the inferior cortex of the neck, an articular cartilage space of normal width a capital epiphysis that is atrophic but is of normal contour, the presence of lamellar shadows of penosteal new bone laterally on the diaphysis b taken 1 year later shows sclerosis of the margins of the primary focus, a diminution in the size of the sequestrum but a narrowed articular cartilage space and indistinct shadows of the bony articular cortices which indicate joint invasion, c taken after 2 years shows invasion and destruction of the opposing regions of the ilium, capital epiphysis and metaphysis





Fiz 10

Fig 9 Case 8. Tuberculous of the hip primary in the thum a, hows area of reduced density x, in the Lam near the joint and 1-cartilage of the acetabulum, normal ar ticular surfaces b taken t year later shows the increased size of the osseous focus, destruction of the neighborns, bony articular cortex of the acetabulum, and a suchtly had tened capital ep phy: c, taken after 3 years, shows mar ginal scierosis about the enlarged buny lesion d taken after 6 years, shows a large area of reduced density in the Zimm with smaller flecks of greater density within it. There is a shadow of intact bony articular cortex over the lateral one third of acetabulum and over the slightly flattened femoral head but loss of it over the involved remon of the acetabulum. e Talen 11 months after eradica. ion of the primary focus in the Lium, shows alling in by bone and no additional evidence of joint destruction f taken 4 mic. hs later shows further narrowing of the articular cartilare space and lateral and messal erosion of the capital epiphysis which indicates active tuberculous arthritis g taken 4 months after operation, shows union of the bone transplants with ankylosis.

Fig. 10. Case 8. Phou graph of resected articular surface of the head of the femur showing relatively well preserved articular cartillage a over the superior portion.

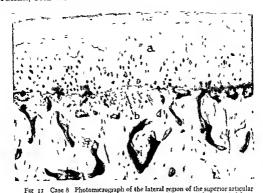


Fig 17 Case 8 Photomicrograph of the lateral region of the specific articular surface of the femoral head showing necrotic cartilage, a, partly separated from the underlying bone by subchondral granulation tissue, b, which has largely destroyed the bony articular cortex (X-25)

joint was freely movable. Knee flexion was markedly limited due to scarring of the quadriceps muscle about the healed sinuses. The roentgenogram (Fig 6, d) taken then shows complete replacement of the flattened capital epiphy as by bone of uniform density and bony repair of the primary neck lesion without evidence of joint destruction.

The character of the metaphyseal lessons varied in the different cases and at different stages of the disease. In 10 cases of Group I, the primary lesson was located in the inferior juxta-epiphyseal region as illustrated in Cases I, 2, and 3, and appeared in the roentgenograms as a local area of reduced density, sometimes with smaller shadows of relatively greater density which represented small sequestra. In the following case the neck lesion was more diffuse and evidence of general involvement of joint structure appeared early

CASE 6 B C, male, aged 11 years, had slight pain in the right hip for 5 months On examination it was found that motion of the hip was restricted to about hall of the normal range. Figure 7, a, shows diffuse rarefaction in the metaphy sis within which appear smaller shadows of greater density than the surrounding atrophic bone. There is also slight mar ginal loss of the shadow of the bong atricular cortex of the femoral head but the cartilage space is un diminished.

At operation curettement of the metaphyseal lesion and arthrodesis of the hip with tibial bone grafts were done Tuberculous synovitis was found to be present Openings in the superior cortex of the femoral neck led to the bony focus from which tubercu lous granulation tissue and many small bone seques tra were curetted. Microscopic examination of the articular cartilage at the lateral margin of the femoral head showed it to be undermined and its bony articular cortex broken down by non-tuberculous granulations Roentgenograms taken i year later (Fig. 7, b) show non union of the tibial grafts to the femur A portion of the primary focus is still evident in the A second operation was done, at femoral neck which time the articular cartilages were excised and massive tibial grafts were placed across the joint Bony fusion was present 4 months later A roentgenogram (Fig 7, c) made 23 months after the second operation shows solid fusion of the joint and healing of the metaphyseal focus

In another case, severe tuberculous infection of the metaphysis resulted in a large bony sequestrum which underwent slow and incomplete absorption over a period of 2 years. A large tuberculous abscess formed early in the disease and regional diaphyseal periosteal bone formed early but disappeared with subsidence of active infection. Healing of local bony lesson evidenced by development of marginal sclerosis and by some filling in by bone

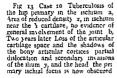
CASE 7 R R Mexican male, aged 2 years and 6 months had pain in the left hip for 4 months and welling of the upper thigh for 2 weeks Examination showed marked muscle spasm at the left hip and a fluctuant mass located laterally in the upper part of the thigh \skin tuberculin test was positive 2 10 000 old tuberculin Tigure 9 a shows an area of Lone absorption in the inferior portion of the femoral neck surrounding a large separated bony fragment which is of greater density than the adjacent living The inferior cortex of the femoral neck is destroyed. The articular cartilage space is of normal width and the bony center of the capital epiphysis is reduced in density but has its normal contour Lamellar shadows of periosteal new bone are present along the lateral aspect of the proximal half of the diaphysis A diagnosis of metaphyseal tuberculosis with secondary arthritis was made and treatment by ammobilization of the hip bed rest, and general antituberculous care was carried out \ roentgenogram (Fig 8 b) taken i year after the first examination, shows some sclerosis of the bone about the large metaphyseal focus and diminution in the size of the sequestrum. The articular cartilage space is slightly narrowed and the shadows of the articular cortices are indistinct. The shadow of periosteal new bone along the diaphysis which was present at the first examination is no longer seen. Although the child's physical condition improved the roentgenogram taken i vear later (Fig. 8 c) shows invasion and destruction of opposing regions of the ilium capital epiphysis and metaphysis. The primary osseous focus in the inferior portion of the neck shows evidence of healing. The sequestrum in the center of the focus is very small

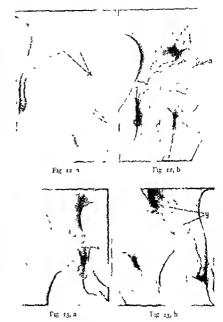
Primary focus in the ilium In childhood the articular cartilages of the acetabulum and the Y shaped cartilage contribute by enchon dral bone formation to the growth of the in nominate bone. In regions of active enchon dral ossification there is a relatively abundant vascular supply so that lodgment of infected emboli from the circulation is favored. In 10 child patients with tuberculosis of the hip, the primary focus was identified in the ilium bor dering on the acetabulum. In 3 of these the early roentgenograms showed the presence of the osseous focus before showing evidence of general involvement of the joint. One of them a 7 year old male. known to have been heavily exposed to tuberculous infection, was recently observed a week after the onset of pain about the hip Roentgen examination at that time disclosed no definite evidence of a bone lesion \ roentgenogram taken 2 weeks later, how ever showed an area of reduced density in the ilium bordering on the acetabulum and

the Y shaped cartilage with a shadow of regional periosteal new bone on the mestal surface of the thum but no evidence of arthrits. Thorough curettage of this focus without entering the hip joint has been followed by subsidence of symptoms and at this time, to months after the operation, there is no evidence of hip joint involvement. In the patient whose case report follows the bone lesson was present for approximately 7 years before there was appreciable evidence of breaking down of the joint.

CASE 8 F W male, aged 12 years, had pain in the right hip for 6 years. The early reentgenogram tigure o a shows a small area of reduced density in the ilium bordering on the acetabulum and the I shaped cartilage Treatment had consisted in plaster encasement of the hmb A reentgenogram taken r year later (Fig. o. b) shows increase in the size of the osscous focus in the ilium with destruction of the neighboring bony articular cortex of the ace tabulum The capital epiphysis is slightly flattened but the cartilage space is normal. A roentgenogram (Fig. q. c) taken 3 years later shows some increa e in the size of the iliac lesion and sclerosis of its mar gins but no further evidence of joint destruction On entry 6 years after the on et of symptoms examina tion showed the hip only slightly limited in motion The roentgenogram taken at this time (Fig o d) shows the large area of decreased density in the ilium with sclerotic borders and small irregular flecks of greater density. The shadow of the articular cortex is absent over the involved portion of the acetabulum but it is intact over the lateral one third and over the somewhat flattened femoral head The cartilage space of the joint is slightly narrowed Because of the absence of symptoms of active arthritis and the absence of definite roentgen findings of general in volvement of the hip joint an operation was done in which the muscles were reflected from the mesial surface of the shum at the level of the anterior inferior iliac spine and the primary lesion was expo ed through a window and curetted out. The cavity which measured 2 by 3 centimeters contained tuber culous granulations and pus Its inferior wall was the acetabular roof but no opening into the hip joint could be demonstrated The operative wound healed without the formation of a sinus. The hip was im mobilized in plaster for 7 months and then motion without weight bearing was permitted for 4 months A roentgenogram (Fig 9 e) taken at the end of this time shows almost complete filling in of the iliac lesion by bone and no additional evidence of general hip joint involvement The patient was then allowed to walk. Infteen months after the operation how ever there was increasing pain and stiffness of the hip and additional roentgenograms (Fig 9 f) show further decrease in the cartilage space and lateral and mediat erosion of the capital epiphysis Active

Fig. 12 Case o Tuberculosis of the hip primary in the ilium a Fourteen months after onset Area of reduced density a is present in the lateral por tion of the ilium bordering on the acetabulum The articular cartilage space is of normal width. The shado is of the bony articular cortices of the head and mestal portion of the ace tabulum are intact b, Ten months later There is collapse of the acc tabular roof with partial dislocation of the head of the femur and a spur of bone, s, from the mum above the head, also a reduced cartilage space of the joint and a loss of the shadow of the bony articular cortex over the superior region of the capital epiphy





tuberculosis of the hip joint was diagnosed and re section of the articular cartilages and arthrodesis by tibial bone transplants were done. The joint cavity about the femoral neck was found obliterated by ad herent tuberculous synovia and the articular carti lage of the acetabulum was thinned but that of the head was relatively well preserved (Fig. 10) joint had probably been involved early by a mild tuberculous process which was quiescent during the years of immobilization and was reactivated by the recent weight bearing A photomicrograph (Fig. 11) of the lateral portion of the articular surface of the capital epiphysis shows the articular cartilage to be intact superficially but invaded and partially separated from the underlying bone by subchondral non specific granulation tissue which has broken down and has absorbed the bony articular cortex Four months after operation there was bony ankylosis of the hip (1 ig 9, g)

In another case an iliac focus of tuberculosis was present before there was roentgen evidence of joint destruction, but extension soon resulted in an extensive breakdown of joint structures

CASF g L & , female, aged 7 years, had lump for 2 years with increasingly severe pain Figure 12, a, taken 14 months after onset of symptoms, shows an area of reduced bone density in the lateral portion of the ilumb bordening on the acetabulum. The shadow of the articular cortex of the acetabulum is intact except at the lateral margin where it is indistinct. That of the femoral head is normal except for regional atrophy, and the cartilage space is normal On bospital entry io months later there was markedly restricted motion of the hip. A rentigenogram (Fig. 12, b) taken then shows breaking down of the care.



Fig 14 a lig 14, b



Fig 15 a Fig 15, b



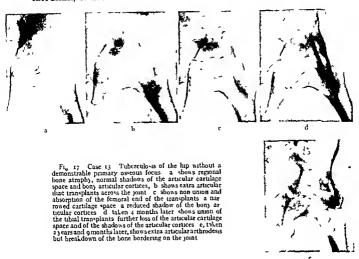
Fig 16 a

Fig 16 b

by 14 Case 11 Primary meta physical tuberulous with secondary extension into the capital epiphysis and the joint a 4rea of resident density 1 messally in the neck and extending into the capital epiphysis moderate coxa vara narrowed early made to be a surfaced to the strength of the comparation of the surfaced property of the surface o

Fig 15 Case 12 Secondary into soon of the capital epiphys and hitmm in tuberrulous arthritis a Taken 5 years alter onset thomes area of rive factors 1 in the capital epiphysis area of rarefaction and selectors 1 in the opposing hitm a signify narrowed cartilage opace and read and the capital epiphysis area of rarefaction and selected shadows 1 in the capital epiphysis area of rarefactors and the capital epiphysis area of rarefactors and the capital epiphysis area of the capital epiphysis and the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis and the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis and the capital epiphysis area of the capital epiphysis and the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis area of the capital epiphysis and the capital epiphysis and the capital epiphysis and the capital epiphysis area of the capital epiphysis and the capital epiphysis and the capital epiphysis and the capital epiphysis area of the capital epiphysis and the capital epiphysis and the capital epiphysis and the c

Fig. 16 Advanced tuberculous of the hap with partial growth arrest a spows destruction in the time capital explays as and neck, of the fermit with students in the shead and students in the shead and students in the shead and atrophic bones small oseous center of greater trochanter t b Taken 3) cers fater shows further destruction and upward displacement of the greater trochanter through the longitudinal growth of its graphy seed cartiage due



tabular wall and partial dislocation of the femoral head into the area of iliae bone destruction. A spur of periosteal bone has formed lateral to the liae lesson. The articular cartilage space is hazy and decreased and the shadow of the bony articular cortex is blurred over the superior central region of the capital epiphysis which is opposed to the lilae cavity.

It operation excision of the iliac focus and arthrodesis of hip were done. A tuberculous abscess was found under the proas muscle A cavity 2 5 cents meters in diameter in the ilium just above the acetabulum was found to extend into the joint through a perforation in the acetabular cartilage Tuberculous synovitis was found to be present. The head of the femur which was partially dislocated was cov ered by articular cartilage which was thinned superi orly The acetabular articular cartilage was markedly thinned The articular cartilage of the acetabulum was curetted away and that of the femoral head was excised in such a way that the epiphyseal cartilage disc between it and the neck was not injured. The bony epiphysis was placed in contact with the de nuded thum and an that bone transplant was placed from the epiphysis to the ilium Solid fusion was present after 9 months of cast immobilization Microscopic examination of sections through the excised cartilage of the femoral bead shows destruction of the bony articular cortex by non tuberculous granulation tissue \o tuberculous tissue was found in the epi physeal bone although there was extensive tuberculous synovitis

Primary focus in the ischium. Primary tuherculous involvement of the ischium with secondary extension into the hip joint was observed in 2 childhood cases. In each of these, roentgenograms made early in the course of the disease showed an area of ischial hone destruction bordering on the Y-shaped cartilage of the acetahulum without evidence of extensive involvement of the rest of the joint. Subsequent roentgenological and pathological examination showed signs of extensive tuberculous arthritis with secondary hone invasions which obscured the point of primary ischial involvement. The following is 1 of the 2 cases.

CASE 10 W W, male, aged 13 years, had pain in the right hip and limp for 2 years Figure 13, a, taken 6 months after the onset of symptoms shows an area of reduced density in the ischial portion of the acetabu-



Fig. 18. Advanced tuberculo 1 of the hip with extensive secondary invasion and absorption in the inno minate bone and loss of the head and part of the neck of the femur I minary point undetermined.

lar wall near the transgular cartulage. The shadows of the bonn articular cortices and the articular cartulages are normal. It entry a vears after the initial symptoms there was limitation of hip joint motion to one half normal range. In the roentgenogram atken at this time (fur 3 is b) there is activately object in taken at this time (fur 3 is b) there is activately object in the bonn articular cortices subbristion marked thinning of the cartulage space and extensive see thin the substitution of the capital femoral epiphsis. At this time at would be impossible to identify the ischial change as the pri mary focus.

Ai operation extensive tuberculous synonitis was found. The articular cartilages were thinned and loosened from the underlying bone. The cartilages were exit ed and full thickness tibul transplanisms were placed across the joint. Healing occurred huit were placed across the joint. Healing occurred huit there was subsequently some tissorption of the bone grafts and solid fusion was not present until 3 years after the operation.

Epiphyseal changes in childhood tuberculosis of the hip. In no instance of childhood tuber



Fig 19 Case 14. Tuberculous of the hip in an adult primary in the greater trochanter. The rociticeonaria shows irregular rarefaction of the trochanter a narrowed cartilage pace of the joint loss of the shadow of the bony articular cortex of the ferroral head and reduction of its shadow on the acetabulum.

culosis of the hip was there evidence either in the roentgenograms or in the pathological specimens of a primary focus in the capital femoral epiphysis. The comparatively early destruction of the articular cortex as revealed by the reduction or loss of its density in the roentgenograms was found on micro-copic ex amination to be due to the action of micro scopically non specific granulation tissue. This suhchondral tissue composed of abroblasts, numerous capillaries round cells, and occa sional foreign body multinucleated cells, ap parently develops by proliferation of the vas cular fibrous tissue normally present beneath the articular surfaces. It appears early in tuberculous arthritis but is not directly con nected with the proliferating tuberculous syn ovia as shown by its presence while the carti lage covering of the head is still superficially intact Although histologically non tubercu lous its peculiar action in breaking down the bony articular cortex with loosening and slow invasion of the articular cartilage makes it a characteristic pathological feature of tubercu

Fig 70 Case 15 Tuberculosis of the hip m an adult, primary in fegreater trochanter, secondary in the joint a, Taken 315 months after fracture of the greater trochanter, show union with an area of reduced den sity, x, in the lateral portion of the fracture line. There is no evidence of joint involvement b, Taken 17 months later shows irregular reduction of density in the greater trochanter a narrowed articular cartilage space and loss of the shadows of the bony articular cortices which indicates tu berculous arthritis

HATCHER, PHEMISTER



lous arthritis. Cases 3 and 8 illustrate the roentgunological and pathological characteristics of early epiphyseal changes due to succhondral absorption

The failure to find evidence of primary localization of tuberculosis in the capital femoral epiphysis in children corresponds with experence in other joints such as the knce and ankle where the primary point of involvement when osseous is usually metaphyseal in location (5) Likewise, experience in pyogenic arthritis of the hip during childhood has shown that primary osseous involvement is frequent in the neck of the femur and illum but is rare in the capital epiphysis (3)

Secondary invasion of the epiphysis by tuberculous tissue occurred by direct extension of the primary neck focus through the epiphyseal cartilage disc and by invasion from active tuberculosis within the joint. Epiphyseal involvement from a neck focus usually took place before there was extensive joint destruction and followed necrosis and absorption of a portion of the epiphyseal cartilage. In some cases the entire bony epiphysis was secondarily involved while in others localized destruction with cavity formation resulted. The following case is one of a primary metaphyseal localization of tuberculosis with secondary extension into the epiphysis and joint

CASE II W H male aged 8 years had limp and mild pain in the left hip for 6 years. On examination there was found only slightly limited motion. I igure 14, a, shows an area of reduced density in the inferior.

region of the neck and epiphysis. The articular cartilage space is only slightly reduced and the shadows of the bony articular cortices are lost and the hony margins are fuzzy. There is moderate cox avara and a bony bridge is present between the central portion of the capital epiphysis and metaphysis which sugrests an earlier growth arrest.

At operation an extensive tuberculous snowins was present A cavity containing granulations occupied the inferomesial portions of the metaphysis and epiphysis. The articular cartilages were loosened from the underlying hone and in the region of cavitation the femoral articular cartilage was depressed. The articular cartilages were removed and tibust transplants were placed across the joint. Two years later there was a bony hridge from the fluin to the femori in the region of the transplants but the joint line was still incompletely filled in with bone (Fig. 14, b).

In most of the advanced cases of tuberculous arthritis the capital epiphysis was secondanly involved by extension of tuberculosis from the joint. This usually occurred late in the disease after the articular cartilages had been extensively absorbed, but sometimes localized areas of secondary invasion occurred before there was advanced joint destruction Such invasions usually produced necrosis and absorption of bone and left cavities not only in the capital epiphysis but also in the opposing acetabular bone. The destruction of bone on both the femoral and pelvic sides of the joint and the failure to find such areas of epiphyseal bone destruction in the early stages of arthritis clearly indicated the secondary rather than primary nature of such lesions. An example of secondary invasion of both the epi-



Fig. 1. Case 16. Secondary bulateral bone inva.no.in unberrulous of the hip in an adult. The rendingengram shows a natrowed cartilage space and loss of the shadows of the bony articular outlees except over the supernor region of the joint where triangular shadows of greater density than the surrounding atrophe bone indicate the presence of hissing sequestra in the femoral head 3 and in the opposing him.

physeal and acetabular bone which left opposing areas of bone absorption is furnished by the following case

CASE 12 (C female aged 8 years had slight pain in the left hip for 5 years with more severes) imptoms during the last year. On examination there was found slight restriction of joint motion. Figure 15 a shows the articular eartilage space to the narrowed and the shadows of the boar articular cortices are



Fig. 22 Case 16 Photograph of the exceed articular surfaces showing sequestra: a in the femoral head exposed centrally but partially covered peripherally by necrotic cartilage, c that sequestrum z and acetabular articular cartilage.

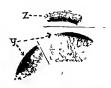


Fig. 21 Case 16 Roentgenogram showing a similar density of the bone in lassing sequestra in the head of the femur. 3 and illum. The surrounding living bone in the femoral head is reduced in den.ity.

fairly well marked over the superior portion of the joint but are diminished mesially on both the acetahulum and the head. Oppoing areas of rarefaction with efferoise margins are seen in the ilium and the capital epiphysis.

At operation tuberculous synovitis was present. Microscopic sections of carulage and bone removed from the superior portion of the joint showed under mining and absorption of the deep cartilage layers by granulations compo ed of throblasts round cells and occasional foreign body multinucleated cells. Ar throdes of the joint was done full thickness tibial bone transplants being used Bony fusion was present 6 months later Figure 15 h, shows fusion 2 vears and 9 months after operation with healing and bony repair of the areas of destruction. The cavity in the head of the femur in this patient approaches mo t nearly that which might be expected in a patient with primary involvement of the epiphysis. The a vear duration of the disease however, and the pres ence of a similar area in the opposing acetabulum make it clear that both lesions are secondary invasions

Although tuberculous unvasion of bone during childhood usually results in necrosis followed by complete absorption, there was in the case of an adolescent female a bilateral secondary invasion of tuberculosis from the bount which produced opposing sequestra which persisted in a manner commonly found in the tuberculous arthritis of adults.

Secondary bone invasions which occurred after the tuberculous arithmis was advanced frequently resulted in a gradual breakdown of the femoral bead and acetabulum. The breaking down usually began in the supernor portion of the femoral epiphysis and in the likac portion of the acetabulum probably because of greater pressure on those opposing surfaces. The late roentgenograms in Cases 7 and 10 ca

demonstrate this tendency to more advanced bone destruction at the points of pressure

Destruction of the cartilage disc between the capital epiphysis and neck resulted in arrested longitudinal growth through the neck When this occurred in young children there was usually continued longitudinal growth for some time at the epiphysis of the greater trochanter resulting in its elevation above the level of the hip joint This is demonstrated in Figure 16, a, which is a rountgenogram of a 3 year old child and shows extensive destruction in the ilium, the capital epiphysis, and the neck of the femur with irregular shadows in the head and neck which are of greater density than the surrounding atrophic hone which is indicative of sequestra. The small osseous center of the greater trocbanter is atrophic but appears uninvolved Figure 16, h, taken 3 years later, shows further destruction of the joint and upward displacement of the greater trochanter through longitudinal growth of its epiphyseal cartilage disc. The necrotic bony fragments of the head and neck have been almost completely absorbed except for small fragments which have become separated and displaced laterally and distally along the diaphysis The capital epiphysis, epiphyseal cartilage disc, and metaphysis have been destroyed leaving only the distal portion of the femoral neck. In Case 11 (Fig. 14) there was partial growth arrest at the mesial portion of the epiphyseal line between the head and neck resulting in moderate coxa vara

Tuberculous arthritis of undetermined origin primary synosial tuberculosis In 44 of the patients it was not possible to state the part of the joint structure in which the infection started Nine of these were observed early in the course of the disease without finding evidence of a hone lesson which could be considered primary Roentgenograms taken at later periods showed evidence of secondary bone invasion in most of them. The primary site of joint involvement in these patients may have been in the synovia but it is possible also that small osseous foci which were not detectable in the roentgenograms were present. The roentgenograms taken of the patient whose case report follows showed no evidence of an early osseous focus, and this may have been

primary in the synovia Late invasion and destruction of bone on both sides of the joint is demonstrated

Cast 13 H E, male, aged 4 years, had pain in the left hip and knee for 4 months Examination showed restricted motion at the left hip Figure 17, a, shows slight regional bone atrophy hut no evidence of joint destruction or of a primary osseous focus

At operation biopsy of the joint and extra articular arthrodesis by iliac bone grafts were done, as shown in the roentgenogram (Fig. 17, b) Microscopic sections of the synovia showed tuberculosis Four months later there was non union of the hone grafts to the femur and at the end of 1 year they were absorbed at the femoral end as shown in Figure 17, c Here the articular cartilage space is diminished and the shadows of the bony articular cortices are indis tinct A second operation was done placing full thickness tibial bone transplants from the ilium to the femoral neck and trochanter. The roentgenogram (Fig. 17, d) made 4 months later shows union with the transplants, further loss of the articular cartilage space, and breaking down of the superior portion of the capital epiphysis. Two years and 8 months later there was solid ankylosis of the hip but the roentgenograms (Fig. 17, e) taken then show advanced destruction of the superior region of the epiphysis, the neck, and to some extent the ilium In this case late bone destruction took place although extra articular arthrodesis was accomplished

In 36 patients, advanced destruction of the joint structures made it impossible to determine accurately either pathologically or roentgenologically the primary site of the joint involvement It is logical to assume that earlier roentgen examinations of some of these patients would have disclosed primary osseous foci Destruction more advanced on one side of the joint than on the other in some patients suggested that the primary involvement bad heen in the bone which showed the greater destructive lesion This could not be depended upon in determining the primary site, however, for in several early cases followed through the course of the disease, as in Case 10, a small primary hone lesion later became obscured in the roentgenograms by massive secondary bone invasion in other parts The major hone destruction frequently occurred in a region other than that of the primary site Massive invasions of the innominate bone or of the femur were more commonly due to secondary extension from the joint than to increase in the size of a small primary lesion situated in

either bone. Usually when the bone on one side of the joint was extensively invaded secondarily the other side showed a corresponding degree of destruction Secondary extension into the femur usually involved the capital epiphysis and adjacent neck but less often the base of the neck, shaft, or trochanter An un usually extensive secondary invasion of innominate bone and destruction of the head and neck of the femur is shown in the roent genogram (Fig. 18) of a 10 year old female who had had untreated tuberculosis of the bip joint for 7 years. This case illustrates well the impossibility of determining the primary point of joint involvement in the late stages of the disease Isolated secondary invasions of the neck of the femur were not observed and the finding of a single destructive lesion in this location even late in the disease is good evidence that it was the primary site of infection

TUBERCULOSIS OF THE HIP JOINT STARTING IN ADULT LIFE

In a out of 12 patients with tuberculosis of the hip which started in adult life, no demonstrahle primary bone focus could be made out either roentgenologically or pathologically Three primary hone foci were observed, 2 in the greater trochanter and 1 in the ilium above the acetabulum The 2 primary lesions in the trochanter extended into the hip joint and produced extensive tuberculous arthritis One of them developed following a fracture of the trochanter in an adult who had active pulmonary tuberculosis The primary osseous lesion in the ilium occurred in an individual with active pulmonary tuberculosis and had not extended into the hip joint at the end of the second year The following 2 cases were pri mary in the trochanter and extended secondarrly to the joint

CASE 14 M D male aged 45 years, had pain about the left hip for 5 years, stiffness for 2 years and swelling of the thigh for 1 year Examination showed a large fluctuant mass located laterally in the upper thigh. Motion at the joint was himsted and painful. Here contengerum Figure 19 shows and painful. Here contengerum Figure 19 shows draphacement of its superior portion. The cartilage space of the joint is narrowed and the shadow of the bony articular cortex is lost over the femoral bead and is diminished over the acetabulum. A di

agnosis of tuberculosis primary in the trochanter and secondary in the hip joint was made and operation was done A large abscess with sinuses leading into the partially destroyed trochanter was evacuated and the diseased bone cleaned out Bone transplants were placed extra articularly from the ilium to the femoral shaft Vicroscopic examination and guinea pig inoculation showed tuberculosis Fourteen months later there was failure of fusion of the transplants to the femur and a second operation was done. The hip joint was entered and extensive tuberculous synovitis was found. The articular cartilages were found loosened from the subchondral bone. The articular surfaces of the top of the head and of the acetabalum were denuded and tibial transplants were placed across the joint Abscesses and sinuses formed with later sequestration of the grafts which had to be removed. Marked infection persisted and 2 years later the patient died

CASE 15 M C male aged 37 years, had had occasional pain in the left knee since the age of 16 Eleven years ago he sustained a T shaped fracture of the lower end of the left femur and following this he had symptoms of active tuberculosis of the left knee which was later excised and arthrodesed Twenty months before entry the patient sustained a simple fracture of the left greater trochanter in an automobile accident Solid union and good function were present after S months but I year after mjury increasing stiffness and pain at the hip were noted Figure 20 a shows early union of the fractured trochanter 31/2 months after injury and an area of reduced density in the lateral portion of the old fracture line The hip joint appears uninvolved at this time. At entry 17 months later there was marked restriction of motion at the hip and x my evidence of an old active pulmonary tuberculous-Figure 20 b shows irregular areas of reduced den sity in the greater trochanter, loss of the articular cartilage space and loss of the shadows of the bont articular cortices A diagnosis of tuberculosis of the trochanter with secondary extension to the hip joint was made and operation of excision of the articular cartilages and arthrodesis with tibial transplants was done An abscess in the trochanter was found and the material cleaned out. Microscopic examination revealed tuberculous granulation tissue. The articu lar cartilages were found loosened from the under

In contrast to other joints such as the Ance and ankle, primary epiphyseal fool located in the jurtia articular region were not found in any of the tuberculous hips of adults. The femoral neck which was so frequently primarily involved in children was not the site of a primary osseous lesion in any of these

lying bone and were markedly thinned Bony anky

losis was present 11 months after operation

Secondary bone in asson in adults Second ary invasion of the femoral head and ilium in

tuherculosis of the hip joint in adults was relatively frequent In 3 of the 12 adult patients, bilateral sequestra were found. These sequestra developed late in the course of active tuberculous arthritis and their bilateral nature indicated that they were the result of secondary invasions of bone, as reported by one of us (1), and were not primary ioci resulting from embolism as reported by Koenig (1) Their location in the superior portion of the femoral head and in the opposed region of the ilium suggests that pressure played a role in their formation The iliac sequestra were smaller than the opposing ones in the femur and extensive regional absorption of the ihum in 2 patients left cavities in which the sequestra lay In the femoral head the sequestra were loosened from the surrounding living bone but extensive absorption of the necrotic bone did not take place Secondary bone invasion with formation of kissing sequestra is illustrated in the following case

Case 16 R R male, aged 20 years, had lamp and pain in the left hip for II months Figure 21 shows narrowing of the articular cartilage space and loss of the shadows of the bony articular cortices over the messal portions of the head and acctabulum In the superior portion of the femoral head there are two triangular shadows of density greater than the surrounding bone, almost separated from each other hy a V shaped noteb and from the underlying bone by a narrow zone of reduced density articular surfaces of the more dense areas are sharply defined In the opposing region of the acetabulum there is a large area of reduced density surrounding a sequestered fragment of articular cortex and under lying bone of a density similar to the areas in the head of the femur A diagnosis of tuberculous ar thritis with secondary bilateral invasion and scoues tration of the articular bone was made and operation was done Tuberculous synovitis was proved by microscopic examination and guinea pig inoculation The articular cartilages were found extensively eroded and loosened from the bone. The femoral head, a photograph of which is shown in Figure 22. contained two almost completely separated seques Its articular cartilage was extensively thinned and loosened from the underlying bone and over the sequestra it had been worn away and exposed the polished articular surface of the necrotic bone. The acetabular articular cartilage was thinned and loos ened marginally but was absent over the region of cavitation in the ilium which measured 2 by 2 cents meters A small sequestrum of articular none was removed from the cavity. The articular portion of the head of the femur was excised, the walls of the acetabulum were curetted, and tibual transplants were placed across the joint Figure 23 is a roent-genogram of the sequestered portions of the femoral head and ilium. The similarity in densities and size of the trabocular of the kissing sequestra indicates that necross occurred simultaneously on the two sudes of the joint and is evidence in support of their secondary rather than primary hature.

In a cases of advanced tuberculous arthritis in adults small areas of secondary bone invasion in the ilium were observed in roentgenograms made late in the disease. Earlier roentget examination showed no bone foct. Pathological examination disclosed cavities in the flum which contained tuberculous granulation tissue with small fragments of sequestrated articular cortex.

SUMMARY AND CONCLUSIONS

Lighty-two cases of tuberculosis of the hip have been studied roentgenologically and 56 pathologically in an attempt to determine the point of primary involvement of the joint structure The studies were made at varying times in the course of the disease. In general, the earlier they were obtained the greater the frequency with which the primary point of infection was located. In 70 patients the disease began in childhood, while in 12 it began in adult life. In the childhood cases it was possible to determine that the primary point of infection was in the bone bordering on the joint in 26, as follows neck of the femur adjacent to the head, 14, thum bordering on the acetabulum, 10, ischium bordering on the acetabulum, 2 It is to be noted especially that in no patient was a primary lesion identified in the head (epiphysis) of the femur In all of these patients except 2 in whom the disease started in the neck (metaphysis) of the femur it sooner or later broke into the hip joint and resulted in a diffuse tuberculous arthritis

In the 44 remaining childhood cases it was impossible to determine the primary point of infection, whether in the synovia, the metaphysis, or the epiphysis. In most of the patients the examinations were made after there bad been secondary invasion and breaking down of bone on both sides of the joint, which was sufficient to obscure or to destroy completely the primary focus in those in whom it was located in the bone. Care has to be

exercised not to mistake an area of bone secondarily invaded in the acetabulum or especially in the head of the femur for a primary asseous facus

In o patients the examination was made early before there was appreciable breaking down of the ends of the hones, and no primary osseous focus was identified which would speak for primary localization in the synovia However, it is impossible in such cases to rule out with certainty a primary osseous focus which was so small that it escaped detection in the roentgenograms or in the rather incomplete pathological examinations that could be made of the tissue excised at operation

In the 12 patients in whom the disease be gan in adult life, the lesion was identified as primary in the greater trochanter in 2, with secondary invasion of the joint. In 1, it was primary in the ilium. In the o remaining it is impossible to state whether the lesions were primary in the synovia or in the bone because of the difficulty of recognition of very small primary osseous foci and because of the extensive secondary invasion and destruction of bone that was present in some cases. It is noteworthy that primary localization of tu berculosis at the hip in these patients is similar to that of pyogenic infection of the same region which is known to be rare in the capital epiphysis and common in the femoral me taphysis and ilium

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BLOOD VOLUME CHANGES DURING SURGICAL PROCEDURES

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→ HANGES in blood volume incident to surgical procedures are a chief concern for the surgeon Actual blood loss is a generally recognized factor, but it may not he the most important consideration to be thought of in surgical procedures In addition there must be considered (1) anesthesia, with its effect upon respiration, arterial tension, and capillary and venous tone. (2) trauma to tissue and handling of viscera with response of the autonomic nervous system, (3) changes in ventilation, affecting insensible water loss and hence the fluid reserve, and (4) the efficiency of the organism in its response, immediate or late, to hemorrhage Postoperatively, influential factors are the changes occurring during recovery from anesthesia and the effects of the relatively high environmental temperatures to which patients usually are subjected for the first few hours following operation Of interest also are the effectiveness of fluids administered by mouth or parenterally in restoring blood volume and the possibility of dangerously augmenting the volume by excessive administration of fluids

Gatch and Little, Maddock and Coller, and Plicher and Sheard have measured actual blood lost at operation, the method employed being the determination of hemoglobin content of washings of drapes, sponges, etc., used at operation. The results of these separate studies agree closely, and little doubt exist as to the accuracy of the findings. Blood losses range from a few cubic centimeters in minor procedures (appendectomy, hemiorrhaphy) to 200 to 300 cubic centimeters in major laparotomies (cholecystectomy, hysterectomy), and may reach 700 to 1,250 cubic centimeters in such procedures as radical mastectomies.

It is possible, however, that the change in circulating blood volume, which influences the condition of the patient during and after opfrom the Medical and Sungeal Clinias of the Peter Beat Brightan Hospital and the Departments of Surgery and Medi cae, Harrand Medical School, Boston

eration, may be far greater than due to blood loss alone Aikawa, using the carbon monoxide method of blood volume determination, observed decreases in total volume ranging from 5 to 39 per cent, averaging about 20 per cent, in 42 of 43 dogs subjected to various abdominal operations Derra (3) employed a combination of the carbon monoride and dye methods in studying changes in volume in dogs under avertin anesthesia and observed either increases or decreases in total volume, the extremes ranging from decreases of 28 per cent to increases of 45 per cent of pre-operative values Schneider and Polano, using the carbon monoude method, noted a diminution in plasma volume coincident with a fall in minute volume early in anesthesia Derra (4) observed in dogs undergoing laparotomies that the plasma volume tended to fall and cell volume to rise but with decrease in total volume

Reissinger and Schneider, using the carbon monoude method, measured blood volume before and after operation in bumans and observed increases of 100 to 1,420 cubic centimeters as well as decreases of 690 to 2,851 cubic centimeters. In all cases the blood pressure was lower after operation than before

In this communication we report the results of studies on 12 patients, selected from the surgical wards of the Peter Bent Brigham Hospital, in whom blood volume changes were determined during the actual surgical procedure and during the recovery period

METHODS

Plasma, cell, and total blood volume were determined by the dye method described by Gihson and Evans (6) This method measures the plasma volume by determining the dilution in the blood stream of an accurately measured amount of an azo dye, "Evans blue," after intravenous injection. The dilution factor used is obtained by extrapolation of the slope of disappearance of the dye from the

blood stream to tune of dye injection. The disappearance slope is constructed from the dye concentrations, as determined with spectrophotometer, of a series of blood serum samples taken over a period of 30 minutes after dye injection. The result obtained represents the plasma volume at tune of dye injection. Red cell and total volumes are calculated from plasma volume and bematoerit values.

Studies were made in 9 patients by the "di rect 'method of repeated volumes, a separate dye injection being made for each determination and successive volumes being corrected for blood withdrawn in sampling for preceding volume determinations Studies of changes occurring during the induction of anesthesia were made in 8 patients by the short "indi rect" method. In this procedure the disappearance slope following the injection of dye for the initial volume is first determined over a period of 40 minutes. Samples are then taken during the administration of the anesthetic. and from the initial plasma volume and the deviation of dye concentration of these sam ples from the prolongation of the disappearance slope changes in plasma volume are cal culated By this method small changes in plasma volume can be measured accurately

Changes in volume occurring during operation were followed by the long "indirect" method in 3 patients In this procedure the initial plasma volume is determined on the afternoon of the day preceding the operation. The disappearance slope is determined the following morning and changes during operation are calculated from the initial plasma volume and the deviation of dye concentration of blood serum samples taken during operation from the prolongation of the disappearance slope. A study of this type is shown in Chart 1 This method permits of making determinations of the plasma volume at any time during operation without another injection of dye

RESULTS

Anesthessa Four patients were studied during nitrous oude-oxy gen induction and ether anesthesia, 2 during avertin induction and ether anesthesia, i during local regional anes thesia with novocain, and r during spinal anesthesia with novocain Pre-operative changes

in blood volume during anesthesia in these patients are summarized in Table I

In every case the induction of anesthesia was accompanied by a slight but definite de crease in the plasma volume The diminution in plasma volume is temporally related to ele vation of blood pressure and pulse and respir atory rates In 2 patients, Cases 253 and 270, in whom anesthesia was induced with avertin. no change in blood pressure occurred, and the plasma volume was but slightly reduced. Fol lowing the administration of ether, no change in pressure or volume occurred in Case 2,3, but in Case 270 a sharp rise in pressure took place, accompanied by a definite decrease in plasma volume In Case 255 a considerable elevation in blood pressure occurred during gas-oxygen and ether induction of anesthesia. accompanied by a striking decrease in plasma volume In Case 260 basal blood pressure was elevated, gas-oxygen ether induction was ac companied by an initial further rise and subse quent fall in pressure, and plasma volume remained fairly constant. In a patient, Case 268, who was operated upon under local novocain anesthesia, infiltration was followed by a sharp use in pressure, and the plasma volume

was diminished
Variable fluctuations in cell volume oc curred. In the 4 patients anesthetized with gas-oxygen and ether it increased in 7 and was slightly reduced in 3. An increase occurred in the 2 cases in which avertin was used, Cases 233 and 270, while in the 2 cases in which novocain was used, Cases 268 and 270, a decrease took place. Thus the cell volume was diminished in 4 and increased in 4 of these patients. Yet in all but 1 case (Case 270) the hematocrit value rose with the induction of anesthesia, indicating a slight hemoconcentration.

As regards total volume, it may be said in general that the degree of reduction therein due chiefly to loss of fluid from the blood stream, parallels the degree of elevation of blood pressure

Effect of surgical procedure The course of changes in plasma and total volume was followed through the period of operation in 3 patients, and during the immediate postoperative period in 2 of these 3, the changes being

TABLE I—CHANGES IN BLOOD VOLUME DURING INDUCTION OF ANESTHESIA IN RELATION TO BLOOD PRESSURE, PULSE, AND RESPIRATORY RATES

					Nitrous	oxide and	oxygen w	th ether					
	He No 226	rniorrhapi 7-23-36	38 Jrs	Hysterectomy appendectomy 1271-36 No 254 F 30 Ms			Incs of No 255	non and so hemorrho 12-3-36	ature ids 30 Yrs	Cholecystectomy 12-17-26 No 260 F 49313			
Anesthe ia level	Basal	Early	Deep	Basal	Light	Deep	Basal	Деер	Deep	Basal	Light	Decp	
Plasma volume c.cm	3670		3510	2310	2190	2155	2530	2450	2380	2060	2035	2040	
Cell volume c.cm	2840		3060	1170	1125	1145	285a	2800	2810	1780	1740	1770	
Total blood volume c tm	8510		6570	3480	3315	3300	447D	4250	4190	3840	3775	0182	
Hematocut cells, per cent	43 6		46 S	33 5	13 9	47	42 3	42 3	43 I	46 0	46 2	46 \$	
Blood pressure mm.Hg	160/60		110/80	130/80	140/81	150/98	110/80	127/83	140/95	190/90	205/105	180/85	
Pulse per min	100		75	60	163	158	68	80	108	110	105	90	
Respiration per min	70		33	13	28	30	20	24	30	20	22	22	
	Rectal avert				jer			ra) infiltra ith novoc		Spinal novocain			
	He 10 253	Hermorrhaphy Resection of colon					G# No 258	stric resec	tion 63 yrs	Herniorrhaphy No 200 M 17 yrs			
Anesthesia level	Basal	Early	Deep	Basal	Early	Deep	Basal	Early	Deep	Basal	Early	Deep	
Plasma volume e cm	3620	3530	3555	2210	2190	2060	2450		2350	2260		2200	
Cell volume c cm	3270	3350	3445	920	970	890	1190		1170	2310	,	2055	
Total blood volume cem	6890	6880	7010	3160	3160	950	3640		3520	4470		4260	
Hematocrit cells per cent	47 5	48 7	40 I	30 0	30 \$	30 I	32 6		33 I	49 4]	48 2	
Blood pressure mm Hg	110/80	120/80	120/80	140/00	140/60	170/70	120/80		150/90	110/70		210/70	
Pulse per min	60	78	90	250	155	165	80	1	220	80	<u> </u>	75	
Percepton per min	-1	20	26			1	1		20			70	

as illustrated in Charts 1, 2, and 3 In these cases particular care was taken to prevent loss of blood and no considerable amount of bleed ing occurred. The blood plasma withdrawn in sampling, not exceeding 60 cubic centimeters during the operation period, was replaced by intravenous injection of equivalent amounts of normal saline, and results were corrected for the small amount of red cells withdrawn In Cases 226 and 224, small fluctuations in

plasma volume and total volume occurred, never greater than 100 to 150 cubic centimeters. These changes can be related to changes in blood pressure associated with the opening of the peritoneum and the handling of viscera. An elderly man, Case 268, with advanced carcinoma of the stomach, in whom local novocain was used, underwent a resection of the pylone end of the stomach and a Billioth I anastomosis. The course of plasma and total blood volume bore an inverse relationship to

changes in blood pressure during the operation. The volume remained below the preane-sthesia level throughout operation and a repeated volume determination at the end of the operation revealed a net decrease in total volume of 250 cubic centimeters. In our opinion this decrease was not due to blood lost during operation but represents a change in volime due to physiological changes in response to trauma of operative procedures.

As shown in Table II, in 10 of the 12 cases in this series the total volume determined at the end of operation was below pre-operative levels, reductions ranging from 60 to 265 cubic centimeters and averaging 154 cubic centimeters in the 2 other cases slight increases amounting to about 50 cubic centimeters took place. In 1 case plasma volume was unchanged, in 11 reduced, extremes ranging from 10 to 290 cubic centimeters, averaging 145 cubic centimeters. Red cell volume was re-

TABLE II -POSTOPERATIVE CHANGES IN BLOOD VOLUME.

Case	number	230	247	354	224	226	231	255	257	260	263	270	290
Age	and sex	35 31	48 F	39 VI	30 F	38 M	42 M	30 M	30 M	49 F	63 M	48 F	17 M
Ope	atioo and date	Tonsillectomy 7-11-36	Terintal tepair	Mysterectomy 12-1-15	Hernorrhaphy 7-22-30	Hermorrhaphy 7-23-36	Late son of paloni Lel sebus 8-6 36	Hemorrhoudectomy	Hernwithaphy 12-5-30	Cholecystectomy 12-17 36	Pyloric resection	Resection of col n 1-0-37	Hern o rhaply S-ap 36
faitial volume	Plasma cem	3180	2030	3310	2765	3670	2845	25,50	3620	2060	2450	2210	2260
	Cell e cm	2370	1110	11 0	2660	2350	1102	1850	3270	1780	1100	9	2210
	T tal blood c em	6050	3620	3450	\$325	6510	5250	4410	6800	3840	3640	3160	4470
	Hematocrit cela per cent	47 3	42 S	33 5	48 0	43 6	45 8	42 5	47 5	45 0	32 6	300	19 4
	Hours minutes postsperat ve	20	0 10	0 10	0 30	o 36	0.30	B 20	0 10	0 30	1 05	0 20	0 20
	Plasma cem	3040	1900	2160	268a	3380	2750	2520	3450	1055	2240	1975	2 60
	Cells c cm	2810	\$453	113	2605	\$170	2470	1010	3350	1785	1150	1015	\$105
8	Total blood c cm	3850	3355	320	5265	6 50	5130	4460	6760	3740	3420	3000	4570
	Hematocrat cells per ceot	47 8	43 2	53 9	45 8	45 3	46 4	42 2	45 3	47 2	33 8	37 5	48 I
lumes	Change in total volume c.cm	-100	-16	-18	-60	+40	—\$ 20	+40	-130	-200	-110	-160	- 00
Š	Weight loss kilograms	• •		08	0.4		0.8	0.8	0.5	10	0 \$	1 5	
Postoperati	Hours minutes postope ative		2 10	_		2 81		_				3 43	\$ 30
\$	Plasma cem		2015			3130						2110	2150
ã	Cells e cm		1545			2875	_	_	_			740	1940
	Total blood c cm		3350			6025		-	_			2850	4220
	Hematocrat cells per cent		43 0		-	47 7						25 3	46 I
	Change to total volume c cm		40	_	-	481	-	_				310	-150
	We ght loss		08			18	1	$\overline{}$				+0:	+04
Remarks		See Note 1	See	See 1	See A	See	See	See vote 4	See	See Note 4	See Vote 6	See	Sra Vote 8

[|] Moderate bleeding | Persistent coam.

duced in 6 patients, the extremes ranging from to 18 5c unbic centimeters, averaging 43 cubic centimeters, and increased in 6 patients, the extremes ranging from 5 to 330 cubic centimeters averaging 112 cubic centimeters. In general, weight loss hore a direct relation to the degree of reduction in total volume.

Thus it is apparent that total volume is diminished at the end of operation, but that an active response of the organism to blood loss, in the form of an influx of red cells into the circulation, takes place during operation

The recovery period That the reduction in the level of the blood volume during the immediate postoperative hours is not due to hlood loss at operation alone is evident from

*s degrees anomia. Little bleeding
*s degrees anomia. Little bleeding
between ad and 3d volume.
*Ago ocus saline intravenously between ad and 3d volume.

data presented in Chart 1 This patient, Case 226, experienced a greater reduction in total blood volume during recovery, amounting at its height to about 500 cubic centimeters, than This change at any time during operation took place after the patient had been placed in the routine "ether" bed, during which period no fluids were given, perspiration was ob served to be moderately profuse, and room temperature was relatively high (8, degrees F) In Case 224 the total volume was slightly increased at the end of operation, due to an increase in cell volume large enough more than to offset the diminution in plasma volume However, observations made after 2 hours in the "ether" bed indicate a continued loss of

¹² degrees anemia hemo tas s good Little bleeding 3L title bleeding Profuse perspiration so either bed

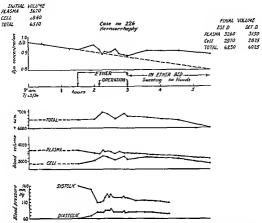


Chart I Changes in plasma, cell and total volume in a patient (Case 226) undergoing hermorrhaphy under ether anesthesia. The method of determining plasma volume at various times during operation from dye concentration value of the prolongation of the disappearance slope and of the blood serum samples is shown. The final re determined volume checks closely with the final estimated volume. Slight changes in volume occurred during anesthesia and operation. The red cell volume increased. During recovery in an "ether" bed a marked diminution in plasma volume took place, reduction in total volume exceeded blood lost at operation.

plasma and a reduction in circulating cell volume to pre operative level

Restoration of depleted blood volume. Two cases in Table II are of particular interest in this respect. One patient, Case 247, in whom there was obvious bleeding, had a reduction in total volume of 265 cubic centimeters at end of operation, or 73 per cent of pre-operative volume, yet several hours later, although no fluids were given, plasma and cell volume were almost completely restored. This patient did not perspire freely in "ether" bed

In contrast, another patient, Case 225, experienced a reduction in total volume of 525 cubic centimeters in a little over 2 hours after the end of operation, during which period no fluids were given. This patient was operated upon on a warm day and was observed to sweat profusely in the "either" bed

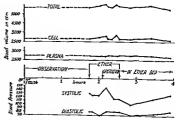


Chart 2 Blood volume changes in a male patient aged 30 (Case 22.2) undergoing blateral hermorrhaphy under ether anesthesia Very little change in plasma volume occurred during anesthesia need to the control of the conmarked increase in red cells resulting in an increase in total volume During recovey no marked disphoresis was noted in this patient and there was no considerable loss of plasma.

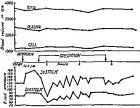


Chart 3 Blood volume changes in a male patient aged 63 (Case 268) with carcinoma of the stomach and second ary anemia undergoing gastric resection and a Billroth I anastomosis under local infiltration with novocain A defi nite diminution in plasma volume accompanied the eleva tion in blood pressure following novocain injection fol lowed by an increase coincident with a drop in blood pressure when the abdominal cavity was opened. The influx of red cells was not marked in this anemic patient although the level was well sustained

To 2 patients, Cases 270 and 290, were given postoperatively 1 000 cubic centimeters of normal saline intravenously Both of these patients showed moderate reductions in total volume at the end of operation. In both cases volume determinations made after the completion of fluid administration showed a slight increase in plasma volume over the immediate postoperative level, but a definite decrease in total volume was shown even from the preoperative level, due to marked diminution in circulating cell volume. Both patients showed slight gain in weight over pre operative values

In this study we have not encountered the extreme reductions or increases in blood vol ume after operation, as observed in dogs hy Aikawa and Derra (3) or in humans hy Reis singer and Schneider and Schneider and Po In practically every instance in our series the plasma volume as determined postoperatively was lower than the pre-operative level We conclude that the variable findings of the above authors arise from errors in the techniques employed, as previously de scribed (6)

EVALUATION OF OBSERVATIONS

It is apparent that the changes in blood vol ume during the induction of anesthesia hear a direct relationship to the rise in blood pressure experienced This finding is in keeping with ohservations made by us on the prompt and considerable decrease in volume that accompanies sudden elevation of systemic pressure, due to exercise or the intravenous injection of insulin or adrenalin It is suggested that this lowering of plasma volume is due to a disturbance of the normal filtration absorption bal ance of the capillaries brought about by an increased pressure gradient from the afferent to the efferent end of the capillaries, more fluid heing forced out into tissue spaces at the proximal end than can be re absorbed at the distal end That this mechanism operates in a reversible manner is suggested by increases in plasma volume seen in course of operation during marked decreases in systolic pressure

An additional factor in the decrease in plasma volume has in the hyperventilation accompanying anesthesia with increased re moval of water from the blood via the pulmo nary aeration hed This factor of increased insensible water loss probably continues throughout the period of anesthesia nemhutal ancsthesia in normal dogs the plasma volume steadily decreases with prolongation of narcosis 1

Of interest is the apparent rapidity with which a falling volume may be augmented by an increase in the volume of circulating red cells This phenomenon not only has the ef fect of aiding mechanical circulatory efficiency through volume restoration but also of increas ing the oxygen carrying capacity of the blood in the face of a threatened anoxemia

None of the cases studied during operation were in the condition known as "surgical shock," systolic pressure having been well maintained throughout In Case 268 (Chart 3) a sharp fall in systolic pressure was accompa nied by an increase in plasma and cell volume from levels obtaining during a previous period of higher blood pressure The concurrent state of falling arterial tension and lowered blood volume was not consistently encountered in this study This observation suggests that low tension "shock" need not necessarily be ac companied by a reduced total blood volume, at least in the initial stages

I G G Lupubly hed beervation

There can be little doubt that the placing of patients in relatively high environmental temperatures during recovery, however advisable from other points of view, has the effect of lowering blood volume. This observation is in keeping with the findings of Gibson, Kopp and Evans (8) in the course of studies on blood volume changes during artificial fever, in which rapid and marked reductions in plasma volume occur during sweating Since the output of the sweat glands is drawn directly from the blood stream, diaphoresis may deplete the circulating volume more rapidly than tissue fluid reserves can restore it. We regard these observations as serving to place further emphasis on the necessity of fluid administration during the period of immediate postoperative recovery

The effect of postoperative intravenous administration of fluids was studied in only 2 cases in this series, and in both an apparently paradoucal response, namely, a decrease in total volume, was encountered, the decrease being accounted for by a withdrawal of red cells from circulation. We have observed that a similar decrease in red cell volume follows the rapid (30 cubic centimeters per minute) intravenous infusion of normal saline solution.

Similar observations have been made recently by Gilligan and Altschule following intravenous injections of isotonic or hypertonic salt solutions Coller, Dick, and Maddock noted retention of water to the point of development of edema in patients receiving salt solutions Our observations in these 2 intravenously cases offer an explanation of the formation of such edema It should be emphasized, bowever, that both of these patients had sound hearts It is possible that in patients with cardiac insufficiency, in whom the blood volume is already increased (7), administration of fluids intravenously might dangerously increase the total volume. It is suggested that hypertonic devtrose solutions are of greater usefulness in restoring depleted volumes than are normal saline solutions

CONCLUSIONS

r The plasma and total blood volume changes during anesthesia, operation, and recovery therefrom are described

2 During anesthesia the decrease in plasma volume bears a direct relationship to the de-

gree of elevation of blood pressure

3 During operation fluctuations in the blood volume level vary with fluctuations in arterial tension, a rise in systolic pressure being accompanied by a fall in plasma volume, and vice versa

4 The total volume is reduced at the end of operation, the reduction being due to a diminution of plasma volume, larger than can be offset by influv of red cells into the circulation

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HEPATIC LESIONS OF THE NEWBORN

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▼ IVER damage in the newborn has seemed to occur more frequently in recent years, probably because of closer observation While the present series of 60 cases is small, and taken entirely from the records of the New York Polychnic Medical School and Hospital-covering a period of approximately 6 years—personal observation of similar lesions has been made in other hospitals. No particular significance was attached to the observations at the time One lesion of the liver, characterized by fatty degeneration and early necrosis, has seemed to be of toxic type. It has occurred with sufficient frequency to justify a review of the clinical history to see what factors might have a hearing on its etiology

The type of lesion found postmortem in the newborn, which bas been most difficult to ex plain, has consisted of a distention of the hepatic cells with a fine deposit of lipoid giving the cells a vacuolated and emulsified appear ance In addition, many of the cells have shown early necrosis and the sinusoids have appeared almost obliterated The lesion has seemed to commence most commonly in the central zone, although it may be distributed in patches throughout the lobule. As the lesion has progressed, the entire lobule has appeared affected, and the liver has been en larged and bas had a tense capsule In the absence of marked congestion, the gross speci men has been of a definite vellow, or brownish vellow color. On section, the cut surface has at times been uniform and at other times mottled, depending upon whether the lesion was uniform, central, or patchy This lesion is definitely different from the diffuse distribution of large fat droplets sometimes found in the livers of newhorn laboratory animals

It is believed that it is possible to recognize pathologically, with a reasonable degree of accuracy, those lesions resulting from pre-

From the Department of Pathology New York 1 olychoic Medical School and Ho pital maturity passive congestion, postmortem degeneration, simple fatty infiltration, syphilis, and antenatal arsphenamine poisoning None account for the lesion described

The premature liver The premature he ers better developed, in so far as histological appearance is concerned, at an earlier date than many of the other organs. There is little difference between the premature her and that of the full term newborn except that the hlood islands are more numerous and larger, the liver cords thinner, the cells smaller, and the sinusoids correspondingly larger. The changes hy which the liver lohules are subdivided into the permanent ones do not take place until after hirth. The premature liver, after fifth month, is just as satisfactory for study as that of more mature newborn halv

Passi e congestion Passive congestion in the newhorn seldom resembles the picture described as chronic passive congestion for adults, unless the hahy has lived for a con siderable period and has also suffered from a definite cardiac lesion The central lohular changes which are so characteristic of chronic passive congestion in adults are more the re sult of some secondary circulatory poisonprobably absorbed from the gastro intestinal tract-than from passive congestion per se Inatomical factors in circulation practically prevent the development of such a lesion in the newborn The passive congestive lesion in the newborn is usually nothing more than an engorgement of the sinusoids, sometimes a rupture of the central liver cords, and a moderate degree of cloudy swelling Four cases of congenital cardiac defect with passive congestion are included in this series of cases Any defect in the heart that would severely influence fetal circulation would be apt to lead to maceration and death in utero

Postmortem degeneration If the necrops 15 performed within a reasonable time after death the gross changes will he slight. The histological changes will consist chiefly of

cloudy swelling, followed by fragmentation and fraying of the cells. The cytoplasm may appear granular or amorphous Nuclear changes follow with pycnosis, caryorrhexis, and caryolysis as autolysis is approached. Then the liver is totally unsuitable for satisfactory study. Fatty changes do not constitute a part of postmortem degeneration. Hyperpyrexia may hasten postmortem degenerative changes, as well as produce the earlier changes which are indistinguishable from postmortem degeneration. Congestion is usually pronounced in hyperpyrexia.

Simple fatty infiltration Simple fatty infiltration is found to a mild degree in the very well nourished newborn, and to a more marked degree if there has been starvation due to any cause, either prenatal or postnatal As a rule, the fat globules-usually single, and large-arc scattered fairly well throughout the various lobular areas with no close relationship to the central zone. In those recently born suffering from intestinal obstruction, including blind pouch defects, congenital pyloric stenosis, peritonitis, meningitis, extreme hydrocephalus, or certain types of drug poisoning, the fatty infiltration may be marked Simple fatty infiltration, alone, is unaccompanied by degenerative changes in the cells even when the droplet accumulation pushes the nucleus to one side

Syphilis Syphilis may occur as a pericellular circhosis as a perilobular hepatitis with monocytic and lymphocytic infiltration in the portal canal areas, or as a patchy gummatous necrosis. The lesion is sufficiently inflammatory in appearance, even when necrosis is extensive, to suggest its cause. There is an associated osteochondritis of the long bones, and the small fibrous or better known large boggy placenta may suggest syphilis. Three cases in this series had evidence of syphilis

Irrenteal treatment Prenatal arsemeal treatment may occasionally induce toxic necrosis in the fetus, but such a condition should be readily recognized through both the history and the extensive necrotic lesion produced in the liver. It is a much more severe lesion than that described Should such poisons as phosphorus, arsenic, mercury, or certain salts of most any of the heavy metals.

be taken by the mother, or such drugs as cinchophen, dinitrophenol, atopban, and others be taken by susceptible individuals, toxic necrosis might develop in the liver of either, or both, mother and child This group of possible factors played no part, in the series of cases presented, in the production of hepatic damage

Acute asphyxia In simple acute asphyxia there is marked engorgement with great distention of the sinusoids, sometimes producing a rupture of the liver cords. Superimposed may be hemosiderosis, and accentuated postmortem degenerative changes. Acute asphyxia should be found in other organs as well. Pulmonary hemorrhage into the alveoli, extreme congestion of all viscera, subpleural and subepicardial petechia are common.

Partial asphyxia Long continued partial asphyxia as the result of excessive maternal antepartum hemorrhage, continued partial strangulation, intracranial damage, excessive maternal exhaustion, massive placental infarction, and postnatal asphyxia should be recognized through the history and the postmortem examination

Only one case is known to have had as a contributing factor excessive maternal antepartum hemorrhage That patient was admitted with a maternal blood pressure of 50/30, and a diagnosis of placenta prævia. A stillborn baby was delivered by cesarean section, and its liver showed marked degeneration like that described Another case is recorded in which the cord was around the neck of the child at the time of delivery. The total time of the second stage of labor, for that case, was 391/2 bours, the baby was covered with meconium, and the liver damage was graded as severe A third case showed maternal uterine mertia Small doses of pituitrin were given and the baby, also with marked hepatic degeneration, was delivered 31/2 hours later

Intracramal damage is not believed to have played a large role in the causation of a secondary lesion in the liver, although it probably played a role in a few cases. The reason for the general denial of intracramal damage as a factor is because of the time element. Most, if not all, of the intracramal lesions occurred during the second stage of



Fig 1 Fatty degeneration and early necrosis in premalure liver Blood slands numerous Congestion moderate

labor Viost of the labor periods were short and in those dying immediately there would have been insufficient time between the moment the injury was sustained and the moment that death occurred for the lesson to have developed Nevertheless it is true that the greatest degree of liver damage was found with the highest frequency in the still born and these same stillborn did show the highest incidence of intracranial damage None of the stillburths in this series show an excord of having been anticipated chinically Macerated fetuses have been excluded be cause of their unsuitability for study.

The factor of maternal exhaustion is a little more difficult to dispose of without some thought \(^1\) rough estimate of the degree of comparative exhaustion can be obtained from a vareage duration of labor (see Table I sections 13 14 and 15) Only 2 cases in



Fig 3 Liver of mature full term baby showing patchy fatty degeneration with early necrosis

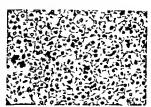


Fig 2 A mature newborn liver showing rather uniform fatty degeneration and early necrosis

which patients showed marked bepatic de generation, are recorded as showing any appreciable degree of maternal exhaustion (Table I, section 12) In 7 cases, distributed through the various gradings patients received small doses of pituitrin or thy mophysin, in 1 of these primary uterine inertia was given as the indication for the administration

Since the placentas are not sent to the laboratory for routine examination it is mossible to state what percentage presented massive placental infarction. Insufficient data are available to be worth while Judging from the lack of notation, it is believed that massive placental infarction did not play a prominent role.

After a study of all of the factors discussed, in only a few cases was a satisfactory explanation offered as to the chology of bepatic degeneration in the newborn Then, what other factors should be considered? Walters and Harris have suggested that opium deriva tives magnesium sulphate barhitune acid derivatives and avertin, reduce the minute volume re-piration with a resulting tendency toward asphy ua Davis bas placed animals under bell jars until anoxemia and asphyxia have occurred In the livers of these animals he found marked fatty changes had taken place He also found similar results following the use of certain types of anesthesia There fore it seemed advisable to investigate the chincal history to determine something about the anesthesia used and the preliminary medication given. The search proved inter esting

In the cases presented the average amount of anesthetic administered was not great, and, except where rectal analgesia was used, the duration of the anesthesia was short (see Table I, section r1) It is perhaps advisable to say at this time that the lesions were graded prior to investigating the clinical history It may he assumed, from the high percentage of difficult second stage procedures carried out, that the anesthesia was fairly The fact that ether, gas-oxygen, and gas oxygen ether anesthesias were used would seem to make little difference, since any of them under suitable conditions might produce lesions similar to those described Evidence of hepatic damage does not usually result immediately from anesthesia, but after a delayed period Time is an element required for the development of a fatty degenerative Patients who die on the operating room table as the result of excessive anest besia show little or nothing in their livers. At the end of a number of hours, if damage has been done, it may then be seen Therefore, it seems that in view of the large percentage of these habies that died so soon after birth, the anesthetic proper administered by inhalation played little part in the production of the liver lesions. It also seems that the preliminary hypnotic medication, and rectal analgesia, played a more important rôle hecause of the longer period of action during the baby's life

Rectal ether analgesia is prohably capable of producing considerable liver damage, in certain instances The mixture is absorbed and utilized for anesthesia over a variable but prolonged period of time. The ether must pass through the portal system of the mother, after absorption, to he eliminated chiefly through the respiratory tract There is the added possibility that quinine may exert its properties in a mild manner as a protoplasmic poison The average period elapsing hetween the administration of the rectal analgesia and delivery of the child was 7 hours, with one exception not here included-that was 75 hours

Each of the derivatives of harhituric acid may have its clinical advantages as claimed However, with reliable products it is believed that the effective dose is not as important, in the production of hepatic lesions,

TABLE I -SUMMARY OF CASES

world according to the severity of the

		Seventy of hepatic lesion									
Section		None	1+	2+	3+	4+	Total				
	Mothers-primipara	10	4	7	4	12	43				
x	Mothersmultipara	10	3	2	9	6	26				
	Average age primipara	25	26	3	31	27	_				
3	Average age multipara	30	31	20	32	30					
	Males autopsied	13	2	4	3	8	31				
3	Females autopsied	13	5	4	0	\$ 6 35 27 30 10 10 10 10 10 10 10 10 10 10 10 10 10	38				
	Premature babies	14	2	4	,	0	28				
4	Full term babies	12	5	5	7	1	41				
	Spontaneous delivery	13	0	3	7	4+ 12 6 27 30 8 10 0 1 2 10 0 12 12 12 14 0 2 2 1 2 2 3 3 3 3 3 4 3 4 4 5 6 7 7 8 8 9 9 1 1 9 1 1 1 1 1 1 1 1 1 1 1 1 1	10				
	Breech extractions		3	,	3	6	20				
	Forceps used	7	4	3	2	7	13				
	Cesatean section	1	-	-	2	-	6				
۰	Congenital cardiac lesions	,	۰	,		-	4				
,	Exidence of syphilis	2	•	0	1	0	3				
8	Intracranial damage (hemorrhage tenturial faceration fracture skull or neck)	10	5	4	3	12	34				
	Stillborn or lived less than 30 minutes	4	3	5	,	12	26				
_	Lived less than 12 hrs	rz.	r	0	,	4	18				
9	Lived less than 24 hrs	2	•	2	0	0	4				
	Lived from 2 to 23 days	•	3	2	5	4+ 12 0 0 8 10 0 1 7 3 0 1 1 1 1 2 2 1 1 2 2 3 3 0 0 1 0 1 1 1 1 2 1 2 1 2 1 2 1 2 1 2 1	25				
10	Maternal toxemia	1	۰	2	1	1	5				
10	Hypertension only	_,	۰	3	,	,	7				
11	Average duration of anesthesia up to mome it of delivery in minutes	27 ,	27*	20	20	28 2					
	Exhaustion recorded	0	0	0	0	2	2				
11	Received pituitrin or thymoghysin but not recorded as showing exhaustion	3	1	1							
13	Average duration of labor in hours			-			7_				
14	Cases with more than	-	21 4	6		_	31				
	Cases with less than	17		-	5	1					
13	Longest periods of labor for individual cases over 12 hrs	72 46 34 24 21 17 14 12	72 28 24 24	55 48 23 17 15 13/2	84 72 14	80 53 39 34 29 26 20 10	3.9				
	Rectal analaesia		- <u>ı</u>	4	-		11				
16	Barbiturates given	4	5	3	,	0	26				
	Received neither	22	ı	2	4		32				
	Totals	26	7	7	-	18	60				

One case of 31's hrs anesthesia not included

One case showed material chaustion one case admitted as a
pacental persura with blood pressure of 50/30 delivered by cesarean
paterial substance one case had pututing administered for failing
streams unertial delivered 3 is his later

as the time that elapses between the administration of the drug and the birth of the child, plus individual susceptibility barbitals act alike qualitatively, differing only quantitatively, so nothing is to be hoped for in the way of better and safer therapeutics from a barbital alleged to be effective in small dosage The efficiency varies directly with The excretion of the barbitals the toxicity is comparatively slow, and the drugs show a tendency to accumulate without complete The drugs are also recognized destruction as having some undesirable properties as general protoplasmic poisons '(3) In ob stetrics, after the administration of barbitu rates it has been observed that the babies have a greater tendency to be apneic and require respiratory stimulation with compara tive frequency The action of the derivatives of barbitume acid is continued at least for a short time, in the child after its birth

In the series presented, the preliminary medication was often administered prior to the onset of true labor. The average dose of sodium amytal was 6 grains, nembutal 41/2, and o grains in x instance, and luminal dosage varied from 11/2 grains to a total dosage of 281/2 grains in one instance. The average period of time elapsing between the ad ministration of the drugs to the mother and the delivery of the child was as follows sodium amytal 17 hours, nembutal 32 hours luminal 26 hours, with a exceptions not included which averaged 134 hours

From the preceding discussion it may be seen readily that no positive conclusions can he drawn from this series of cases nor any similar series of cases based on chinical and pathological evidence, primarily because of the multiplicity of factors involved

Sixty nine newborn infants were subjected to necropsy and showed livers suitable for study. Nearly every case except 2, presented a definite cause for death which was sufficient to exclude liver damage as the chief cause Many of the babies were prematurely born (see Table I, section 4) A large number were born by difficult breech extractions with the aid of forceps (see Table I, section 5) A high percentage presented evidence of intracranial damage such as hemorrhage, tentonal lacera tion, or other evidence of injury in the region of the head (Table I, section 8) Eight of these showed definite fractures of the skull, 2 occupito parietal osteodiastasis, and 3 a fractured neck

By reviewing section 16 of Table I it may be observed that of the 26 cases showing no evidence of hepatic damage only 4 received preliminary hypnotics Of the correspond ingly opposite group, showing marked hepatic damage, there were 18 cases Fifteen of these had preliminary medication of some sort. It will also be noted that for this latter group the average length of life after birth was the short est of any group (Table I, section o) Twelve of the 18 babies lived less than 30 minutes The longest Actually, 10 were stillborn anesthetic given to any in this group was 45 minutes with an average of 281/2 minutes (Table I. section 11)

The purpose of this article has not been to suggest that the use of barbitals is entirely undesirable. It is not believed that the bepatic lesions described could bave done more than add to the embarrassment, and certainly many cases must recover without evidence of hepatic damage when there is no other primary factor to produce death. The only suggestion that can be drawn with reasonable safety is the derivatives of barbitume and and rectal ether analgesia when administered to the mother are not completely without toxic action on the fetus If these drugs are used judiciously, they ought to give satis faction Should their touc action be dis regarded they will be found to exert an em barrassing detrimental effect on too many occasions

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ACUTE OSTEOMYELITIS OF THE UPPER END OF THE FEMUR

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→ HANGES in bonc similar to those caused by osteomychus have been found in the remains of prehistoric animals The head and neck of the femur of a giant wolf found in a pleistocene deposit in California showed changes resembling those which result from a "septic hip" infection as seen in a child today (28) Evidence of osteomyelitis has been seen in prehistoric human bones uncarthed in caves and burial grounds of Europe, Asia, Northern Africa (6), and North America (20) Egyp tian mummics have shown destruction of the mandible resulting presumably from infection (38) The Hippocratic school recognized the bone infection which followed compound fractures and endeavored to prevent and to treat it

Throughout the dark ages little was added to the knowledge of osteomyelitis until the fourteenth century when John Ardenne advocated the removal of sequestra, and Scultetus, in 1634, is said to have been the first to resect the shaft of a long bone for infection (47) 1705, J L Petit described an acute disease of the long bones which we now recognize as acute osteomyclitis, and Nelaton, in 1834, suggested that the term osteomyelitis be used to designate infection of bone (40) Pasteur, in 1878, isolated the Staphylococcus aureus which he considered the cause of a "furuncle of bone," and, in 1884, the same organism was sbown by Becker to be the usual causative agent of acute bone infection

It remained for Lexer, in 1896, to elucidate the pathology of acute bematogenous osteomyelitis by producing the disease in rabbits Meanwhile, Senn, in 1895, had observed chincally the primary focus in the metaphysis and was among the first to advocate early drainage of this area as the treatment of choice in acute osteomyelitis. During the twentieth

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century advances have been made in the treatment of the systemic infection, and there bas been a more widespread acceptance of the principles of drainage of the infected bone as advocated by Scnn, Lever, and Starr

ANATOMICAL CONSIDERATIONS

A knowledge of the anatomy of the upper part of the femur and the hip is necessary to an understanding of the course followed by infections in this region. The changes in the location of the epiphyseal lines of the upper femur throughout infancy and adolescence are shown by the roentgenographic tracings in Figure 1 The epiphyseal line of the head of the femur is partially intracapsular at birth and becomes entirely intracapsular when the child is 2 or 3 years old Throughout the period of growth the epiphyseal line of the greater trochanter is in close juxtaposition to the capsule of the hip joint on the upper anterior aspect of the femoral neck (10), while the couphysis of the lesser trochanter is at some distance from the hip joint Because of the proximity of the joint, infections of the femoral neck arising in the metaphysis opposite the capital epiphysis or the epiphysis of the greater trochanter frequently give rise to a pyarthrosis of the hip

The blood supply of the upper end of the femur (Fig 2) throughout the period of bone growth is derived in large part from the superior branch of the nutrient artery, as was well shown by Lever and his associates These observers also described the vessels which penetrate the periosteum and enter the cancellous bone of the upper end of the femur, as well as the branches of the medial and lateral femoral circumfles arteries which pass through the capsule of the hip joint and course along the neck beneath the synovial reflection to join the vascular bed at the capital epiphyseal line The vessels in the round ligament, which

have long been recognized, have recently been

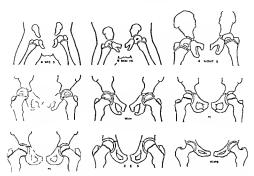


Fig : Tracings of roentgenograms showing the epiphyseal lines of the upper end of the femur. The capital epiphysis lies within the capsule of the hip joint after 2 years of age and the epiphyseal line of the greater trochanter is in close juxtaposition to the cap ule of the hip joint.

restuded and are considered by some observers (17, 50) to be of major importance in the nutrition of the capital epiphysis during the period of growth, while others (42, 46) attribute some of this function to arteries which penetrate to the head from the epi physeal line.

The transition in the vascular tree from the relatively narrow calibre of the nutrient artery to the wide circulatory, hed of the capillanes is attended by a slowing of the lood stream at the epiphyseal line. As the capillary buds grow upward into the epiphysis they form diverticulous vascular pouches in which the capillary circulation is even more markedly slowed (31). Thus, any trauma sufficient to damage the capillary wall in this region may well lead to the stagnation of the local circulation, the lessening of the local resistance, and the creation of a favorable site for the development of infection from organisms in the hlood stream

The lymph drainage from the upper end of the femur ascends through the deep lymphatic trunks to reach the shac lymph glands (17) From the hip joint the lymph drains by

way of the deep system into the deep femoral and iliac lymph glands (18) It should be noted that there are no direct trunks from the upper femur or hip to the inguinal lymph glands and that the latter do not become en larged or tender in cases of infection of the upper femur, or hip joint, until late in the course of the disease, if they are affected at all

PATHOLOGICAL CONSIDERATIONS

The present conception of the early bone changes in acute hematogenous osteomye litis is in large measure derived from experi mental reproduction of the disease in rabbits Rosenhach was among the first to produce ex perimental hematogenous infection of bone by injecting organisms into the blood stream and fracturing the tibia, however, it remained for Lever to produce in rabbits a disease com parable in virtually every respect to the acute hematogenous osteomyelitis of man By in jecting Staphylococcus pyogenes aureus into the veins of young rabbits, he obtained early foct in the metaphysis adjacent to the epi physeal line He also demonstrated the spread of infection along the epiphy seal line to give

ase to supperiosteal abscesses, and where the piphyseal line was largely intracapsular as at he hip, showed direct extension of pus into the joint cavity as a result of rupture through the synovia from the lesion at the epiphyseal ine1 (Fig 3) The marrow cavity was thought to he involved hy progression of the infection through the cancellous hone of the metaphysis, recently, however, this extension is helieved to occur more often from the subperiosteal region wa the haversian canals (45) Late in the acute stage of the disease soft tissue abscesses from the spontaneous rupture of a subperiosteal abscess or of a pyarthrosis of the hip may occur The series of pathological changes observed in the experimental animal has been seen repeatedly in the acute hematogenous osteomyelitis of man

The microscopic picture of the early focus is that of a minute abscess in which the organisms can often be seen. While the inflammatory reaction is confined to the metaphyseal side of the epiphyseal line, organisms have been found extending up into the adjacent epipbysis (36), and at times the infection penetrates directly through the epiphyseal cartilage into the joint As the lesion spreads, thrombosis may contribute to the bone necross caused primarily by the infection (47) Although it is beyond the scope of this paper to consider chronic osteomyelitis, the frequency of separation of the capital epiphysis of the femur late in the course of acute infections of the femoral neck should he noted. In long standing infections of the hip joint with attendant relaxation and destruction of the capsule, there is also a tendency for the head of the femur to hecome dislocated Unless preventive steps are taken, secondary infection of the hip often results in destruction of the epiphyseal cartilage (33) and eventual ankylosis of the hip Following damage to the capital epiphysis there is often a disturbance of the growth of the femur which results usually in shortening of the leg although at times lengthening may occur

If our experimental laboratory a virulent culture of hemolytic Studyholocous aureus was injected unto the nutrient artery of the feature groups or microscopic before the relief of these gammals developed either groups or microscopic before the relief of the study of the relief end of the feature though in it the support and the feature was two, I cd in one of these is parathrosis of the him sale occurred Fight cases of prentitions of the kines were found and in several of these the spread into the youth limit and the supposed line round the demonstrated the special time descense about the expelypsed line round the demonstrated in

The systemic effect of the disease and the complications which not infrequently develop from the co-existent blood stream infection are of equal importance to the bone focus Although the toxemia which forms so prominent a part of the clinical picture is due to the presence of the infection (8, 16), the patient's resistance may he lowered hy the development of dehydration and acidosis Metastatic abscesses may occur in any organ but are most frequent in other bones, in the kidneys, and in the lungs 2

CLINICAL CONSIDERATIONS3

Between 1930 and 1936, 21 patients with acute hematogenous osteomyelitis of the upper end of the femur were admitted to the wards of the Duke Hospital In this survev the children with mild or low grade infections, and those with acute transient symp toms, have not been included With few excentions a complete follow-up study has been made of each patient at intervals of every ra months or less and efforts have been directed toward obtaining an accurate clinical and x-ray record of the disease in the individual case These patients have been of particular interest hecause they present a difficult prob lem in diagnosis and in treatment. The observations which follow are recorded not in the conviction that the therapeutic method chosen has always heen correct, but in the hope that by comparing our results with others, which have been and will be reported, a satisfactory method of treating this very difficult infection may he reached

Six of the patients studied were infants. these cases are analyzed in Table I This arhitrary separation of the problems presented in infants from those presented in older children is made hecause acute osteomyelitis in infancy calls for different therapeutic procedures (11), and is usually followed by less permanent disability Fifteen patients hetween the ages of 3 and 16 years (Table II)

¹⁹¹ for re-children admitted to the Buke Hospital during the past 5 neuronals neither sense mention of clind upon whom authoring were performed 8 showed precumonism or pulma the provided properties of the procumonism of pulma positive properties of the procumonism of the other positive procumonism of the other positive procumonism of the other positive processes which were a with mentature boar because a bucked certain clinic science with the vacantity intrombens described by Whenday Speries and Expert Hospital Part and Dr. A. R. Shandis Jr. for per materials to the first processor to follow and report the sections:

TABLE I—ACUTE OSTEOMYELITIS OF THE UPPER END OF THE FEMUR IN INFANTS LESS THAN 2 YEARS OF AGE

-								
No Age, months Sex	Duration ol symptoms prior to operation days	Foct of infection	Blood culture	Operation	Traction Cast	Culture from femur or hip	Length of	End result
13127 20 Male	6	Upper respiratory infection—varicella Fall 39.4 degrees C 30.000	Staphy lococcus aureus	Dramage of subpersosteal abscess upper end of femus		Staphy lo- coccus aureus	Died 4 days after opera tion	Died No autopsy
z3916 zz Vlale	21	Eryspelas None 39 6 degreea C 14 200	Beta hemolytic atreptococcua	Drainage of pparthrosis hip	T followed by C	Beta hemoly tic strep- tococcus	5 months	Sinus bealed hip mobile no shorteoing x ray, decakificati o of neck o lemur
15565 12 Male	23	Upper respiratory infection None 42 degrees C 15 400	Staphy lococ cus aureus	Drain ge of poarthrosis hip	T followed by C	Staphylo- coccus sureus	2 months	Sinus healed hip mobile no shortening no x ray
19631 19 Male	24	Upper respiratory infection None 39 6 degrees C 25 800	∖o growth	Dramage of soft tissue abscess of thigh	T	Staphy to- coccus sureus	Died 8 days after opera- tion	Died. Autopsy, acute outcomy clitic of the upp end of the femu very early abscesses in the kidneys the lungs and the live.
17319 12 Female		Upper respiratory infection one så degrees C	Baciliva Influenza	Dramage of soft tissue about hip joint	T	Bacillus Induenza	Died 15 days after opera- tion	Died Autopsy, acute osteomy shits I the neck of the femur purul at arthritis hip purulent menang its lobular pneumons.
78733 TO Female	1	Upper respiratory infection None 38 degrees C 24 000	Not taken	Drainage of py arthrosis hip	T 2 mo	Staphy lo- coccue aureus	Under treat ment at present	a months after onset t exted by truct on at home sugas healed x ray destruction fueck of lemus

were seen and form the subject matter for this report

DIAGNOSIS

It is difficult to make a diagnosis of acute osteomy clitis of the upper end of the femur in the early stages of the illness The infection originates in a bone covered by a large muscle mass, the child often is unable to localize his pain to a small area and may refer it to the general region of the hip, the thigh, or the knee The examiner frequently cannot dem onstrate tenderness limited to the bone, and he may find it very difficult to eliminate the numerous disorders which simulate primary involvement of the upper end of the femur Moreover, the clinical picture of a lesion which begins in the metaphysis of the neck and is complicated by early infection of the hip joint differs from that presented by the patient with a primary focus in the metaph ysis opposite the greater or lesser trochanter, which does not extend to cause a pyarthrosis of the hip Also, the formation of a soft tissue abseess from extension of a suh

periosteal or hip joint infection may still further alter the features of the case. To determine accurately the status of a given patient, it is not only necessary to make a diagnosis of osteomy-clitis of the upper femur but it is also important to know the exact site of the primary focus and its subsequent extension.

The symptoms and signs presented by an acute osteomyelitis developing on the meta physical side of the capital epiphysical plate of the femur are well illustrated by the following case

W E (No 71223), a white boy 13 years of age was admitted to the Duke Hospital on August 6 1395 complaining of pain in the left thigh Six days previously he had noticed a furnacie on the inner aspect of the left thigh and a days later he had a child and developed sever pain in the left think as child and developed sever pain in the left think and the lef

Physical examination on admission revealed an acutely ill white boy with a temperature of 39 8

degrees C (103 5 degrees F), a pulse of 110, and respiration of 22 He complained bitterly of pain in the left groin which radiated down the thigh to the inner aspect of the knee There was a healing fur uncle on the medial aspect of the left midthigh and another on the dorsum of the right wrist There were numerous dental cavities, the pharynx was injected, and the tonsils were enlarged and inflamed Deep pressure elicited tenderness over the neck of the left femur in Scarpa's triangle, however, there was little if any tenderness over the trochanter or the neck of the femur posteriorly The left hip could be moved through an almost normal range of motion when the maneuver was performed slowly The pa tient was as comfortable when the thigh was extended as when it was flexed

Studies of the blood showed hemoglobin, 100 per cent, white blood count, 8,400 Differential polymorphomyclears, 85 per cent (segmented, 58 per cent, stah, 26, I forms, 1 per cent). The unne examination was negative and a blood culture taken on admission showed after 48 hours a growth of hemoly the Staphylococcus aureus. Roentgenograms of the p-lyss and femora showed no bone abnormality

A tentative diagnosis of acute osteomielitis of the upper end of the left femur was made and slan traction was applied to the patient's left leg to await localizing signs before resorting to operation. This conservative measure (a transfusion was given also and fluids were forced) resulted in some relief of his pain, the temperature, however, re mained elevated and the blood picture did not change Three days after admission he suddenly began to complain of more severe pain in the hip and asked for the traction to be removed as he felt more comfortable with the left thigh flexed Examination at this time showed tenderness on pressure over the neck of the left femur anteriorly in Scarpa's triangle, and marked tenderness on pressure over the trochanter as well. When the traction was removed he held the left thigh flexed, abducted, and slightly externally rotated The muscles about the hip joint were spastic and any attempt to move the left thigh at the hip caused marked pain and voluntary re sistance

At this time roentgenograms of the pelvs and iemora were negative and the leucocyte count was 9,000 Å diagnosis of pyarthrosis of the left hip secondary to extension of a primary focus at the capital epiphyseal line was made, and the patient was operated upon at once The hip joint was found to be filled with thick yellow pus (from which hemolytic Staphylococcus aureus was cultured), and on the inferior aspect of the neck of the femir at the capital epiphyseal line a sinus could be seen where an abscess in the metaphysis beneath had perforated the synowis to infect the joint (fig 4)

The close similarity in the clinical picture between a primary infection at the capital epiphyseal line and a lesion which originates at the epiphyseal line of the greater tro-

chanter makes it virtually impossible to differentiate clinically between the two in their early stages Even after following such cases carefully over a period of years with roentgenograms at frequent intervals, one may be unable to determine which area is the site of the primary focus A pyarthrosis of the hip may follow an infection originating either in the metaphysis opposite the capital epiphysis, or in that opposite the greater trochanter The following case is an illustration of an acute osteomyelitis which from the available clinical and roentgenographic evidence started in the metaphysis opposite the greater trochanter and caused a secondary pyarthrosis of the hip

B S (No 8106), a white hoy 9 years of age, was admitted to the Duke Hospital on September 30, 1031, with the complaint of severe pain in the upper right thigh which radiated to the inner aspect of the right line. One week previously he had seemed listless and had had a dry cough. Two days later he first noted an aching pain in the right thigh which grew progressively more severe, and at this time he developed a temperature of 103 degrees to 104 degrees F which remained elevated until admission. For 2 days he limped about the house, but for the 43 hours immediately hefore entry he had remained in bed with the right thigh flexed.

Physical examination revealed an acutely ill white boy with a temperature of 40 degrees C (104 degrees F), a pulse of 122, and respiration of 26 The tonsils were large and red, the pharyax was miceted, and the cervical lymph nodes were enlarged. He preferred to he on his back with his right tight fexed at the hip and slightly adducted. Any attempt to move the thigh passively encountered resistance and caused marked pain referred to the lower part of the thigh and the knee. There was tenderness over the entire upper thigh, greatest over the lateral aspect of the femur immediately below the greater trochanter.

Studies of the blood showed bemoglohm, 75 percent, white blood count, 9,000 Differential polymorphonuclears, 81 per cent The utine examination was negative but on a blood culture taken on admission there was a growth of Staphylococcus aureus within 24 hours Roentgenograms of the pelvis and lefmora were negative On aspiration of the right hip joint a small amount of turbid fluid was obtained which was negative for organisms on examination of a stained sincer but which showed later a growth of Staphylococcus aureus

A diagnosis of acute osteomyelitis of the upper end of the femur was made, and at operation, after the houe was exposed, perforator openings were made at the point of maximal tenderness below the greater tenchinter A pocket of necrotic bone and

TABLE II —ACUTE OSTEOMYELITIS OF THE UPPER END OF THE FEMUR IN CHILDREN OVER 2 YEARS OF AGE

					T			
Hi tory No Age Sears Sea	Duration of symptoms prior to operation days	Foc: of infection Trauma T White blood count	Blood culture	Operation	Traction Cast	Culture from femar or hip	Length of follow up years	End result
6802 6 Male	2f	None demonstrable None 39 2 degrees C 10 500	Not taken	None	T 2 mo C 1 Pio	Not taken	S	Walks with limp t a inches chortening no motion at hip x ray bony ankylosis
16505 Male	11	Tonsill us Blow over hip 30 6 degrees C 78 400	Staphylo- coccus aureus	None	T ma.	Aspiration of hip Staphylo- coccus aureus	3	Recurrence of acute symptoms 2 years after original infec- tion at present infect; a quescent walks with imp- r inches shortening slight motion at hip-x ray, destruc- tion capital enabysis
Female	11	Pansinusitis None 39 6 degrees C 31 400	Staphylo- eoccus aureus	None	T 1 mo C 3 mo	Not taken	5	Walks with marked limp an- kylo is of hip dislocation of head of opposite femile
faş 14 Female	3	None demonstrable Vone 40.8 degrees C 18 000	Not taken	Drilling nock of femus pus encountered necrotic bone drained	Trwk C 1 mo	Staphy lococcus aureue	5	Walks without limp rinch abortening excellent motion at hip joint x ray destruc to a capital ep physic
7 54 14 Female	4	Upper re piratory injection Fall on hip 30 6 degre e C r8 500	Staphylo- coccus aureus	Drilling neck of femur pus encountered necrotic bone drained	T 4 mo C none	Staphy locuceus aureus	٠	Walte with elight limp a built up sole 14 inches anoticoling good roots a et hip x rey partial destriction of cap tal eriphyess and chorrening of once of femur
8106 Male	10	Upper respiratory infection Fall on hip 40 degrees C 0 000	Staphy lo- eoccus aureus	Uniling of cancellous bone below tro- ebanter necrotic bone drained	T ; tho C smo	Staphy lococcus aureus	5/	Welks witho t limp no anort ening excellent motion et h p x ray arras of old tope destruction of intertrochan- ter e region and neck
77557 Male	5	None demonstrable Fall on h p 40 3 deg ees C r6,000	Hemoly tic staphylo- coccus aureus	Drilling neck of femur pus encountered area of necrotic bone drained	T 1mo C 1mo	Hemolytre Staphylocoe cus aureue	•	Chronic invalid due to chrone octeomy chias multiple bone tovol ement including the upper ends of both femora with ankylo in ol both hips
Male	8	Furuncul e e Fail on hap 39 8 degrees C 17 800	Staphy lo- coccus aureus	Drainage subperior- leal abscess about upper end of femur drilling femur below frochanter	T book C 4 mo	Staphy locoe Cus aureue	•	Walke with imp, e meb chort ening fair mot on at hip a tay destructs n of capital epiphysis
74b8 16 Female	28	None demonstrate None 38 z degrees C 11 000	Not taken	Drainage sul perios- Jeal abscets about upper end of femur drilling femur below trochanter	T 3 wk C 3 mo.	Hem byte Staphy lococ- cus aureus	\$	Walks with slight lump 2 toob ebortening fair motion et hip a re; partial destruction cei ital epir hi sis and arch of fernur
Signé Male	10	Name demonstrable Blow on thigh 4n degrees C 17 year	Hemolytic staphylo- coccus au eus	Drainage Subpenos- teal abscess about upper end of lemur	T cods C none	Staphylococ cus aureus	*	Walks without ump no mathip ening extellent to tron at hip z 123 old destruction : ter trochanters: rek in
54 53 12 Male	•	Upper se paratory injection Fall on hap 50.4 degrees C 21 200	Hemotytic staphylo- coccus aureus	Dramage subpert s- teal abscess ab ut upper end of femur	T n oc C 4 mo	Hemolytic Staphylococ cus aureus	•	Walks with crutches good functional results who is the tenting and good notion at hip first affected and drained early upper end of opposite femur developed to the myellits of need late with resultant stiff hip on opposite some
45325 26 Vale	30	No focus demons- trable Strained hip 39 4 degrees C 27 000	Hem titic staphylo- coccus aureus	Dramage subperios- teal and massive soft tissue abscess about upper end of feming	T 18da. C none	Hemolytic Staphy lococ cux aureus	Died	D ed 13 days after admission and operation no autopsy clinical evidence of stapty lo- coccal pneumonia and pyclo- net firsts
44789 Male	28	None demonstrable Fall on thigh 30 degrees C 13 600	Not taken	Dramage pyarthroses hip soint dralling neck of femus	T none C 8 ms	Hemolytic Staphylococ cus aureus	J	Walks with imp ripch short ening hip ankyl sed z 15y destruction of capital epiphy 5 5
54500 Female	8	No focus demons- trable Fall on thigh 40 4 degrees C 17 000	Hem tytic staphylo- coccus aureus	Dramage pjarthrosis h p.j. int	T 3 Wk C 6 mo	Hemolytic Staphylococ cut aureus	1	Walks with marked imp a mak shortening poot not on at hip chronic externy chits upper ind of femur
71223 Male	8	Furunculosis None 40 3 d grees C 8,400	Hemolytic staphylo- eoccus aureus	Dramige pyarthrons hip joint	I 6wk C pms	Hemolytic Staphylococ cu., aureus	•	Under treatment at p ment chronic osteom) clius of upper end of femur

pus was encountered and the bip joint was not drained Following operation the child's temperature, which had been elevated, gradually fell and remained normal after 10 days. The leg was kept in extension by means of shin traction for 12½ months, and this was followed by the application of a plaster hip spica for 3½ months. When this was removed 6 months after the onset of the infection, the incision had healed, and the patient has had in subsequent recurrence over a period of 5½ years.

The reentgenograms made every week during the 81 days the patient was in the hospital showed an area of bone destruction about the metaphyseal side of the greater trochanter 3 weeks after the onset of symptoms. The bone destruction spread up toward the capital epiphysis, however, there was never any extensive involvement of the capital epiphyseal line whereas there was extensive decalcification (destruction) of the metaphysis opposite the greater trochanter (Fig. 5). As the primary changes in the hone were above the operative drill hole the latter was not considered responsible for the progressive hone destruction. With healing there was no growth disturbance.

In the preceding case little fluid was obtained on aspiration of the hip, and the joint was not drained at operation. None the less, cultures of the fluid later showed a growth of Staphylococcus aureus, and subsequent roentience of the articular surfaces of the hip joint. The patient belongs to the group of infictions which originate in the metaphysis opposite the greater trochanter, cause varying degrees of destruction of the femoral neck, and give rise to a secondary pyarthrosis of the hip by extension through the adjacent synovia.

In contrast to the lesions which cause secondary involvement of the hip, as illustrated by the preceding cases, is that group of primary foci which originate in the metaphyses of the greater and lesser trochanter and do not extend to infect the hip joint Osteomyelitis arising at any point in the upper femur may, of course, involve the entire neck and invade the hip joint, however, if the lesion is recognized early, adequate drainage may prevent joint extension and thus lessen the possibility of a subsequent ankylosis. The following case is one of that group in which the primary focus may occur in the metaphysis of the greater or lesser trochanter and is not followed by secondary joint infection

G C (No 53916), a white boy 7 years of age, was admitted to Duke Hospital on June 13, 1935, with

the complaint of pain in the right thigh and fever which had been present for 5 days. The pain had been maximal just below the greater trochanter and had become progressively more severe. He had been unable th walk since the onset. Having been seen by his family physician during the epidemic of poliomyelitis he was admitted with the diagnosis of poliomyelitis.

Physical examination revealed an acutely ill white boy with a temperature of 40 degrees C (ro4 degrees C), a pulse of 150, and respiration of 30 The patient was lying flat in hed and was shielding his right thigh against any pressure. After his confidence had been gained he could be persuaded to mive his third through a fair range of motion without pain, and there was no muscle spasm about the hip. The single consistent positive finding was marked tenderness over the upper third of the thigh, maximal on the lateral aspect below the greater tro-chanter.

Studies of the blood showed hemoglobm, 72 per cent white blood count, 9,000 Differential polymorphonuclears, 88 per cent Examination of the urine was negative. A blood culture taken on admission showed a growth of hemolytic Staphylococcus aureus after 45 hours. Roentgenograms of the pelvis and femora were negative and the spinal fluid was hormal. On aspiration of the hip no fluid was obtained.

A diagnosis of acute osteomyelitis of the upper femur was made, and at operation on incision of the subcutaneous tissue at the point of greatest tenderness below the trochanter, a subperiosteal abscess was encountered and drained Subsequent roentgenograms showed an area of hone destruction in the metaphysis apposite the greater trochanter which extended into the intertrochanteric region month after operation the incision had healed, and 6 months later there was roentgenographic evidence nf satisfactory healing of the bone in the diseased area (Fig 6) In this case the infection in the can cellinus bone decompressed itself by the formation of a subperiosteal abscess and at operation the area of necrotic cortex through which the pushad made its way was easily removed with the thumb forceps

Taken as a group, children who have a severe osteomyehts of the upper end of the femur (as contrasted with the mild type of infection) have an acute onset with pain in the general region of the hip or thigh which often radiates to the medial aspect of the knec. There may be a history of antecedent injury of the extremity, and a respiratory infection, a furuncle, an infected laceration, or varicella pustule may suggest the probable source of the bacteriemia which precedes the bone involvement. Occasionally there is a prodromal period characterized by malaise and general lassitude, and a chill may usher in the acute

illness An clevation of temperature is noticed near the time the pain becomes severe Although the child may limp for a few hours after the onset of symptoms, the pain becomes more severe and be soon goes to bed and resents and resists any attempt to move him or his painful limb. The appetite is lost, vomitting is not infrequent, and in infants diarrhea and convulsions are not uncommon

Examination early in the illness may reveal a fretful, ill child who cannot localize his pain hut who complains when the crib is jarred or when any attempt is made to touch or move the affected thigh. The temperature is elevated as a rule to between 188 degrees C (102 degrees F) and 41 degrees C (106 degrees F) Ifter gaining the patient's cooperation, it may be possible to determine that there is definite tenderness over the neck of the femur in Scarpa's triangle, or medially or posteriorly or over the lateral aspect below the trochanter Repeated efforts to locate a definite area of tenderness should be con tinued, in so far as the patient a condition will permit, until the examiner is convinced that his observations are accurate. Later in the course of the disease there is spasm of the muscles about the hip and as the joint be comes involved the thigh is held flexed, abducted, and slightly externally rotated. Any attempt to move the limb from this position causes pain and is resisted by the patient Even at this time there is seldom any swelling of the region affected When, however, a large subperiosteal abscess has formed or a soft tissue abscess has developed from exten sion of a pyarthrosis of the hip, then swelling of the thigh and buttock is the rule effectual treatment the clinical diagnosis should be made long before this stage is reached

Laboratory procedures, while of assistance, cannot supplant accurate clinical observation. The leucocyte count usually is elevated, ranging from 10,000 to 30,000 white blood cells, but in a severe infection it may be low with an ahnormally high proportion of non segmented cells (16). Routine examination of the urine as a rule is negative, however, the test for lipuria (Hedit's sign) (13) should be made, and if it is found positive it is of significance.

The roentgenograms of the pelvis and femora show no evidence of bone destruction until a weeks or more after the onset of symptoms. however, when the hip is involved secondarily. widening of the joint space is visible hefore the appearance of bone changes A procedure of great aid in making the diagnosis, and at the same time in determining the extent of the infection, is aspiration of the hip joint, this should be carried out on all patients who are suspected of having acute osteomyehtis of the upper end of the femur A needle of large caliber (No 18) is introduced under local anesthesia along the anterior surface of the neck of the femur until the roint space is entered, and the aspirate may be studied by a stained smear and by culture. If frank pus is obtained, or if organisms are present on the smear, there is infection of the joint and the sevents of the involvement may be gauged by the type of exudate present

On the other band, the absence of purulent fluid in the hip joint does not rule out consoned in the fluid of the upper end of the famur, as cases without hip joint infection frequently occur. Nor does the presence of a parthross of the hip always point to a primary lesson in the femur, although this should be considered probable until it is proved to the contrary. A number of disorders closely simulate acute ostoomychius of the femur and must be eliminated before a differential diagnosis can be made.

DIFFERENTIAL DIAGNOSIS

Primary parthrosis of the hip Purulent arthritis of the hip due to the pneumococcus and to the gonococcus is of common occur rence and most frequently develops as a com pheation of an acute infection due to these organisms elsewhere in the body. A primary synovial infection of the hip joint hy the streptococcus may not he rare, however, a py arthrosis due to the Stapby lococcus aureus is most often secondary to a focus in adjacent bone (5, 35) Hence, if pneumococca, gono cocca, or streptococca are found in the fluid aspirated from the hip, the diagnosis of a pri mary joint infection may be considered probable One reservation should be made with regard to the pyarthrosis caused by the

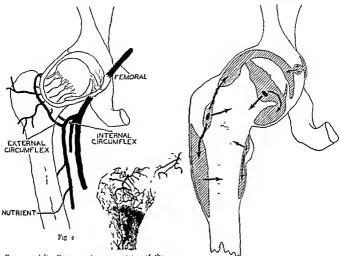


Fig 2 a left Diagrammatic representation of the major arterial blood supply of the upper end of the femu in an adolescent child (from dissection). The anastomous between the branches of the unternal and the external femoral circumfiex arteries which encircle the neck of the femur provide a good source of blood supply to the epi physeal line by branches which penetrate the capsule and he along the neck of the femur beneath the synous b. The vascular bed at the epiphyseal line of the upper end of the femur in an infant (after Leaer). The nutrient artery is a main source of blood supply for the epiphyseal vascular bed. Secondary sources are branches from the periosteal circulation and vessels which run in the round hyament.

Fig 3 A diagrammatic representation of the possible routes of extension of infections arising at different points in the metaphyses at the upper end of the femur

Fig. 4. W. E. (No. 7123). Exposure at operation of the neck of the femur and of the capital epiphyseal line when draining a pyrathrous of the hip secondary to an acute osteony cluts of the upper end of the femur showing the point of rupture of the abscess in the metaphysis which had opened into the joint to cause the py arthrosis

streptococcus, as a certain proportion of these purulent hip joints are also secondary to an acute osteomyelitis in adjacent bone. However, the streptococcus infections of the hip are well considered as one group, for when the diagnosis of joint involvement is made early, and the patients are treated by joint dramage

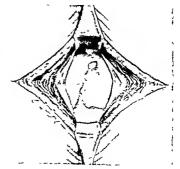


Fig 3

Fig 4



Fig. 3. B. S. (No 8106) a left. The patient 5.15 years after an acute staphylococcus asteony-little of the upper end of the right femue complicated by a particus of the hip. Dramage was provided by dralling the neck of the femuer. Defecting orgam of the patients a pelus 5.7 years after the acute infection showing the well preserved capital epiphysis with evidence of old bose destruction in the metaphysis opposite the greater trochaster. The patient has a normal rance of motion in the

and traction, the bone lesson decompresses tiself into the joint and there is little bone destruction and subsequent disability (30) In the following case a primary streptococcal lesson of the neck of the femur drained spon taneously and was not treated by traction until 7 weeks after the onset of the infection yet a mobile hip joint was obtained in spite of extensive joint involvement

B S (No 21751) a white girl 7 years of age was admitted to the Duke Hospital on January 31 1933 Following an attack of otitis media she had suddenly developed severe pain in the left hip 7 weeks before admission. For a weeks the pain in the hip which at times radiated to the left knee persisted and her temperature of 102 to 104 de grees I remained elevated A blood culture at this time showed a growth of hemolytic strepto coccus Forty eight hours after the onset of the pain she kept her thigh flexed and resisted any attempt to move it. Three and one half weeks after the onset of her illness an abscess in the soft tissue about the hip drained spontaneously. The child Lept the hip flexed and was brought to the ho-pital 7 weeks after the onset of acute symptoms because of her in ability to extend the thigh

Examination revealed a pale ill looking, emaca ated white girl 7 years of age. The left hip was held flexed at 45 degrees slightly abducted and in ternally rotated. Any attempt at manipulation caused her to cry with pain Posterior to the greater trochanter, over the huttock, were cars of sinuses through which the abscess about the hip had drained spontaneously

Studies of the blood showed hemoglobin, 74 per cent white blood count 14 000 Examination of the urine was negative Roentgenograms of the pelvis and femora showed a destructive process in the neck of the left femur with epiphy seal separation and upward displacement of the shaft

The epiphy seal separation was reduced by traction, and after reduction the hip was immobilized in a plaster spice cast for 6 weeks. For 6 months thereafter the patient used crutches. At the present time 4 years after her illness she walks with a lump and has 2 centimeters of shortening of the left leg which can be corrected with a built up sole. There is a satisfactory range of motion at the hip joint although the roentigenograms show absorption of the capital epiphysis and that the metaphysis of the neck of the femur articulates with the acetahulum (182.7)

A streptococcal infection at the capital metaphysis of the femurfollowed by app arthroso of the hip is a not uncommon complication of otitis media in children (47, a) Purulent arthritis due to the streptococcus is betterated by early drainage of the joint (3, 43), traction, and subsequent immobilization if necessary Occasionally in the less severe

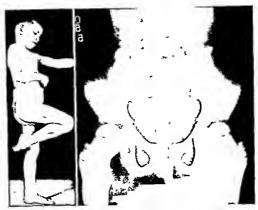


Fig 6 G C (No 53016) a left. The patient 2 years after an acute staphylo coccus osteomy elius of the upper end of the right femur. The primary focus in the metaphysis of the neck of the femur opposite the greater trochanter extended to form a subpenesteal abscess which was subsequently drained. The hip was not in volved by the infection and there is normal motion in the joint. B Roentgenogram of the patient's pelvis taken 2 years after the acute infection showing a normal capit all epulpsus with evidence of healed esteomylctis in the intertochanteric region.

cases good results may be obtained by traction alone (47, a)

As the clinical picture of an acute py arthrosis of the hip is so similar to that of an acute ostcomyelitis of the upper end of the femur, the differential diagnosis between the two often depends on the information obtained on aspiration of the joint. At times it may be necessary to follow the patient over a period of months before the final opinion is reached In this connection it is important to note that a primary synovial infection may show no bone destruction over a period of months except as a result of pressure after the articular surfaces have been damaged by the mfection The following case of primary pneumococcus arthritis of the hip illustrates the absence of bone destruction in the presence of a hip joint infection of long standing

L H (No 50081) a colored infant was brought to the Duke Hospital on November 13 1935, with the complaint of swelling of the left this, for 3 weeks, developing shortly after an attack of pneumonia The mother thought the patient had "some fever' throughout her illness

On examination the temperature was 39 5 degrees C (103 degrees F) The left thigh and buttock were swollen, hot and tender Any attempt to move the left leg caused the baby to cry out with pain

Studies of the blood showed hemoglobin 75 per cent white blood count, 18,600 Differential polymorphonuclears, 78 per cent The urine examination was negative Roentgenograms showed widening of the left hip with dislocation of the head of the femur above the acetabulum Aspiration of the hip joint yielded thick green pus from which pneu mococcus type IV was cultured

The soft tissue abscess was drained, and at operation an opening into the hip joint was demonstrated Roentgenograms at frequent intervals over a period of 9 months after the acute illness have failed to reveal any area of destruction in the head or neckof the femur, and the capital epiphysis remained intact although attempts to keep the head in the acetabulum have been unsuccessful (I ig. 8, a)

Acute ostcomyclitis of the innominate bone and ilium. Two patients with primary acute ostcomyclitis of the ilium have been seen dur-



Fig. , B S (No 2175) a left. Roentgenogram of the patient's polivis showing the destruction of the capital epiphysis of the left femur and the neck articulating with the acctabulum 4 years after an acute sureptococcus osteomychus of the upper end of the femur b. The patient has a normal range of motion in the hip except for limitation of abduction.

ing the past 6 years. Four of these suffered from the acute diffuse type (27) of the disease with destruction of the acetabulum and in volvement of the hip joint. In no case was the diagnosis made until the region of the hip joint was exposed at operation or until there was roentgenographic evidence of bone de struction In reviewing the histories of our patients and of reported cases (2 3, 41, 49) no significant difference was found in the symp toms presented by a patient with an acute process in the neck of the femur and one with a primary tocus in the acetabular portion of the ilium The finding, on physical examina tion of an abscess in the internal iliac fossa or of marked tenderness over the inner table of the ilium on rectal examination has sug gested the diagnosis of acute osteomychius of the drum. At times tenderness has been demonstrated over the external table of the ilium and asymmetrical muscle spasm about the hip (10) or limitation of extension with retention of mobility at the hip joint (2) has suggested the presence of an iliac lesion When, as in 3 of our patients, the hip joint was involved however, the physical findings were so similar to those of acute ostcomvehtis with secondary joint extension that the differential diagnosis was made only after there was roentgenographic evidence of bone destruction in the illum. Of some importance is the fact that acute osteomyelits of the upper end of the femur is six times as frequent as a primary infection of the illum.

Leute ostcomselitis of the ischium and pubis Although the majority of the cases of osteomyelitis of the ischium and the pubis are subacute, and the patients frequently develop a pelvic perineal, or inguinal abscess before they reach the surgeon, occasionally a fulmi nating infection of the acetabular portion of the ischium or the pubis will be seen. Thus, the usual patient with osteomyelitis of the pubis may complain of pain over the pubic ramus The 3 patients with subacute osteomy chitis of the ischium who were seen during the period covered by this study had pain and tenderness about the upper medial portion of the thigh and perineal floor. In such cases a mass may be demonstrated arising from or attached to, the pubis or the ischium In con trast to this group, however, is the fulminat ing infection originating in the acetabular por tion of the ischium or pubis Such a case was a 10 year old boy whose symptoms and signs so closely simulated those of acute osteomyelitis of the upper end of the femur that a differential diagnosis was not made until operation





Fig. 8 a left. L. H. (No yoost). Roentgenogram of the pelvis of a 3½ year old child 13 months after an acute pyarthrosis of the left hip due to pneumococcus type IV. In spite of dislocation of the head of the femur there has not been complete destruction of the capital epiphysis and fragmentation of this structure is only recently beginning h, B. G. M. (No 78733). Roentgenogram of the pelvis of

a 10 months old infant which was taken 3 months after a pyarthrosis of the right hip due to the Staphylococcus aureus (and probably secondary to an acute osteomy elitis of the neck of the femir) showing early destruction of the capital epiphysis which is characteristic of the staphylococcus hip infections secondary to a primary focus in the neck of the femir

B McI (No 66002), a white boy to years of age, was admitted to the hospital on April 20, 1936 complaining of pain in the left thigh whot radiated to the knee For the 3 days since onset be had been in bed, unable to walk, and had an elevated temperature of 193 to 104 degrees F

Physical examination showed an acutely ill white bow to years of age lying in hed with the left thigh fieted and slightly externally rotated. The left thigh was diffusely swollen with points of maximal tenderness present over the greater trochanter and the lateral aspect of the midthigh. Any attempt to move the extremity caused severe pain.

Studies of the blood showed hemoglobin, 85 per cent, white blood count, 12,000 Differential polymorphonuclears, 91 per cent Examination of the urine was negative, and a blood culture taken on admission showed a growth of hemoly its Staphylococus aureus 24 hours later Roentgenograms of the pelvis and femora were negative

A tentative diagnosis of pyarthrosis of the left hip secondary to an adjacent osteomyelitis was made and the hip joint was aspirated without obtaining any fluid. The neck of the femur was then explored without locating a focus of infection, and cultures of the bloody serum from the hone later showed no growth. The child was returned to the ward and after skin traction was applied to the left leg he was given hemolytic Staphylococcus autitoxin and a hlood transfusion.

In spite of these measures the temperature remained elevated to between 40 and 41 degrees C (104 to 106 degrees F) and the child failed to im-prove He continued to have pain in the general region of the hip and no new area of local tenderness could be elicited. It was thought advisable to explore the acetahular rim and 48 bours after admis sion a second operation was done. At this time perforator openings were made in the margin of the acetahulum, and on the second attempt, anteriorly and above the neck of the femur a pocket of pus was encountered and drained The patient's convalescence thereafter was satisfactory, and 2 weeks later there was roentgenographic evidence of bone destruction in the acetabular portion of the pubis (Fig 9) Subsequently this infection involved the hip joint, however, extensive hone destruction was limited to the acetabular portion of the pubis The same clinical picture, and complication, could have been presented by an acute osteomyelitis of the acetahular portion of the ischium 1

Acute transient infections of the hip This group is composed of patients with pain in the hip, an elevation of temperature, and an increase in the number of leucocytes The onset

"Since these cases were studied a 15 year old girl (No 82346) with an acute infection a bout the hip joint has been seen. First diagnosed as an acute outleany exits of the upper fearur the subsequent course of events cause outleany formal featon to be in the ischium. Drainage of the hip joint was followed by subsidiates of the section infection.



pig o B Mcl. (No 00000) Reeningengrate of the pulse of a patient with symptoms and signs suggesting acute osteony-elitis of the upper end of the femur Lx ploration of the femur on admission failed to expose the focus of infection. However prompt improvement followed drainage of the upper margin of the acetabulum at a second operation a days later

of the condition usually is acute, and while the child may walk painfully with a limp for a short time he is soon more comfortable in bed with the thigh flexed. There are varying degrees of tenderness over the trochanter and the neck of the femur antenorly and pos teriorly Movement of the thigh may cause pain but this is not so great as that present in a case of pyarthrosis of the hip, and there is less muscle spasm about the joint than in the latter disorder Aspiration of the hip joint Treatment usually yields negative findings hy means of skin traction applied to the affected extremity, plus general supportive measures usually affords rapid relief of symp toms The pain becomes less and less severe and over a period of from 1 to 2 weeks the temperature falls to normal symptoms fluctuate in intensity and should multiple joint involvement supervene a diag nosis of acute rheumatic fever would suggest it self If within 48 to 72 hours, the conservative therapy has not brought about great improve ment in patient s symptoms and signs they will likely be found to be due to a more permanent lesion than an acute transient infection

Subacute infections about the hip joint This group of inflammatory lesions of the upper

end of the femur, hip joint, and pelvis are characterized by a more gradual onset, milder local symptoms, and less constitutional reaction than is the case in acute osteomychtis This difference in the severity of the symp toms and signs allows the physician more time to form an opinion as to the nature of the infection The same diagnostic measures may be indicated as are applicable in the cases of acute infection, yet the subacute case may be treated conservatively without anxiety, at least for a time, while one awaits changes in the vray photograph or the development of a localized subperiosteal or soft tissue abscess However, even in this group of patients the hip joint should be aspirated, as the informa tion obtained helps to establish the diagnosis Occasionally in the subacute infections it is impossible to differentiate between a pyogenic and a tuberculous lesion until a biopsy is done

and a tuberculosis is not until a bolly is doctored times it may be necessary to evolude acute polnomychits, acute appendicuts, or acute metastatic posoa absecss (4.1) before a diagnosis of acute osteomychits of the upper end of the femur can be made Elimination of such mjurics as separation of the femoral epiphysis or dislocation of the hip may be indicated, and Legg-Perthes' disease occasionally may need to be ruled out. In all cases suggesting these diseases a careful study, including the usual diagnositic procedures, will enable a differential diagnosis to be made with outgreat difficulty.

TREATMENT

A most important factor in the treat ment of acute ostcomyelitis of the femur is the time which elapses between the onset of symptoms and the establishment of the diag nosis (1, 26 30, 44) Moreover, early diag nosis is important in securing a good end result not only in those patients with acute bone lessons but also in those with either primary or secondary pyarthroses of the hip Vevertheless the need for careful determina tion of the patient's physical status, and adquate preparation for any operative procedure contemplated, is as great in this group of infections as in any acute surgical condition During the period of observation which in many instances is necessary, the essential

studies may be done, the original impression confirmed by re-examination, and the patient's condition improved by the administration of fluids. The tovemia may be combated by a transfusion and the use of antisera (16), and the patient's pain frequently may be relieved by the application of skin traction to the extremity affected.

In most instances the lustory and physical examination alone will indicate a focus of infection in the region of the hip. The accessory examinations should include a study of the blood with a white blood count and a differential leucocyte count Even in a severe toxemia the total number of white blood cells may be low, but the differential count with an increase in the proportion of nonsegmented leucocytes may aid in gauging the The urine, which should be examined especially for a lipuria (13), may give confirmatory evidence of a primary bone lesion A routine blood culture on entry is indicated in every case suspected of baving acute hematogenous osteomyelitis The presence of a Staphylococcus aureus blood stream infection demonstrable within 24 hours after admission may add considerable weight to the clinical impression of a primary bone focus Little assistance can be derived from the roentgenograms until 2 weeks after the onset of acute symptoms, and frequently more than 3 weeks clapse before there is definite evidence of bone destruction. When the hip is involved there may be widening of the joint space at a relatively earlier date

Aspiration of the hip should be carried out on every patient who presents symptoms and signs that suggest the presence of an acute pyogenic infection in the region of the joint, and if fluid is obtained it should be studied by a stained smear and by culture. If examination of the stained smear is negative for organisms, a growth may appear on the culture after 24 bours By this means the group of synovial infections due to the pneumococcus and gonococcus and those due to the streptococcus may be differentiated from the Staphylococcus aureus pyarthrosis, which is secondary to a focus in adjacent bone Should pneumococci or streptococci be demonstrated on aspiration of the hip, prompt open drainage

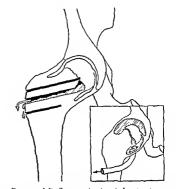


Fig to a left Operative treatment of acute esteome this of the upper end of the femur. Drill holes are made up through the neck to the capital epiphyseal line as represented. However, or if the abscessis superficial the cortical bone is removed with a rongent until adequate draining is obtained by If a frank, pyarthrosis of the hip is present, a rolled up strip of Penrose tubing is used to drain the joint rolled up strip of Penrose tubing is used to drain the joint.

of the joint with the application of skin traction to the affected extremity may be the treatment of choice. In addition to the usual supportive measures, antisera, immune transfusions (23), and sulfanilamide (27) may be of benefit. In our experience, unless traction is used in connection with other measures in hip joint infections due to the gonococcus, destruction of the articular cartilage occurs and is followed by ankylosis of the hip

Should no fluid be obtained on aspiration of the hip, and if there is any question of the infection being acute and severe, it may be wise to apply skin traction to the leg and watch the child for 24 hours. At the end of this period the blood culture may show growth, better localizing signs may be present, and during this time it may be possible to improve the patient's general condition by the use of antiserium (16). Lack of improvement at the end of this time or a positive blood culture of Staphylococcus aurieus points to a primary focus, most probably in the neck of

the femur In the type of problem herein described and in the case with well defined localizing signs which can be diagnosed when first seen as an acute ostcomychtis of the up per end of the femur, the upper femur should he explored as soon as the patient's general condition warrants Although some (14) have advised the creation of a large opening through the neck of the femur, we think that explora tory drill boles through the neck and can cellous bone below it will serve to demonstrate any pocket of infection present, and, when gross pus is encountered, the small hole can be enlarged with a perforator (Fig 10) The method used for drilling the femoral neck provides for exploration of the metaphyseal area while disturbing as little as possible the blood supply of the epiphyses and the epiphy seal line (lig 2) Should no gross infection be demonstrated, the operator is faced with the problem of exploring the acetabular margin or of awaiting the results of the cultures of the bloody fluid from the drill holes in the femur At this point it may be wise to confirm the previous hip joint findings by direct aspira tion of the joint through the capsule exposed on the posterior aspect of the neck of the femur

The decision regarding exploration of the margin of the acetabulum should be made on the merits of the individual case. We have failed to find a lesion in the neck of the femur or in the hip and have returned the patient to the ward only to explore the acetabulum 48 hours later when the patient failed to improve and when cultures from the femur were nega tive. In other instances it may be wiser to proceed and explore the acetabulum at the initial operation. Once a focus of infection is found it should be opened sufficiently wide with a perforator to relieve pressure and allow adequate subsequent drainage Especial op erative procedures for treating acute infec tions of the ilium (2), ischium, and pubis (24) have been reported

If, on aspiration of the hip joint, Staphy lococcus aureus is found, the joint infection is, very probably, secondary to a focus in adjacent bone, and the problem anses whether to drain the upper femur, or the hip joint, or both Drainage of the hip under these conditions has been advanced as the procedure of

choice (5, 13, 20, 34, 36, 43, 44) but there are on enthusiastic reports of the results obtained in the Staphylococcus aureus infections. Drilling the neck of the femur bas its advocates (1, 14, 30) and under certain conditions others advise draining the joint and drilling the femur as well (12, 34). From the short series herewith reported (Table II) in didactic statement of the optimium method can he made, however, we believe that if the patient's pain is not relieved by hip joint drainage, or if the signs of toxima persist, the neck of the femur should be explored also

In this series of cases the patients who were seen and operated upon within the first z weeks after the onset of the acute symptoms showed less permanent disability and a lower mortality than those who came to treatment after that time. We have not obtained satisfactory results in the patients in whom drain age of the hip joint was done, however, our experience with this procedure has been limited. We are now draining the hip joint in all cases of joint involvement and hope at a future date to report our added experience.

The best results are obtained in those patients with acute osteomyelius of the upper end of the femur whose symptoms are recognized and treated by drainage of the bone focus before secondary involvement of the hip point occurs

Following operation, skin traction should be applied to the affected extremity and the thigh should be Lept in a partially abducted and slightly flexed position. In older children the limh may be suspended in a Thomas splint with a Pearson attachment and the patient may be encouraged to move the leg Should the toxemia persist following operation, re peated transfusions (39) and the administra tion of staphylococcus antitoxin (16) have 1 positive blood proved most beneficial stream infection after adequate drainage of a lesion about one hip may suggest the presence of a metastatic focus, possibly in the upper end of the opposite femur as occurred in 2 of our cases

The progress of bone destruction may be followed best hy roentgenograms of the pelvis and the upper end of the femur at intervals of from 7 to 10 days during the first 6 weeks of

the illness The duration of the maintenance of traction must be determined individually in each case, however, when the hip joint is affected, traction should be continued for 6 weeks or longer If the capital epiphysis should begin to separate or the head of the femur to dislocate, a plaster hip spica may be applied, keeping the patient's thigh abducted, slightly flexed, and slightly internally rotated Immobilization in plaster following the use of traction usually is necessary in the majority of cases and should be maintained until there is good evidence of healing. Crutches, with or without a walking splint, may be used for several weeks before the patient is allowed to bear weight on the affected leg Throughout this period efforts should be made to increase the mobility at the hip Should shortening of the leg occur, a built-up (cork) sole may help correct a limp

SUMMARY

- I A resumé of the historical, anatomical. and pathological aspects of acute osteomyelitis of the upper end of the femur is pre-
- 2 Twenty-one cases of acute osteomyelitis of the upper end of the femur are reported, of which 6 occurred in infants and 15 in children over 2 years of age
- 3 The differential diagnosis is discussed and the value of aspiration of the hip joint as an aid in making the diagnosis is emphasized
- 4 From the authors' experience they conclude that the treatment of choice in cases of acute osteomy clitis of the upper femur due to Staphylococcus aureus is early diagnosis and drainage of the bone lesion
- 5 Supportive measures including antiserum and repeated transfusions are of value
- 6 During the postoperative period traction followed by immobilization in a hip spica until there is evidence of bone healing has been found to give best results

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SOME SURGICAL ASPECTS OF TUBERCULOUS DISEASE OF THE ABDOMINAL LYMPHATIC GLANDS

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N INVESTIGATION into the preoperative histories and postoperative
results in 230 consecutive cases of
caseous and calcareous abdominal
lymphatic glands has brought together many
points of interest. The patients were admitted into one of the wards of the Aberdeen
Royal Infirmary during the 10 year period
1923 to 1932 and may be classified as follows

TABLE I

Nature of case	Traced or dead	Untraced	Males	Females	Totals	
Cascous cases	36		21	17	33	
Calcareous cases	144	22	φī	75	166	
Re-operation cases	31	.4	25	20	35	
Totals	213	18	127	117	239	

The ward only exceptionally received patients under 22 years of age as these were referred to the Hospital for Sick. Children The ages of the 38 patients with the caseous type of the disease was considerably less than in the calcareous type. Apart from two of 36 and 52 years, they were under 20 years of age, and yielded an average of approximately 21 years with a median of 18½ Of 201 patients operated on for the calcareous type of the disease the average was just over 25 years of age and the median 23. Ten of the 38 patients with caseous glands, or more than a quarter, were between 11 and 15 years. This differs from Braithwaite's findings that

Between the age, of 10 and 15 years there appears to be a period when the disease is not commonly evident

It is possible that different ages of admission to hospital in different localities may explain this. I wenty-eight of the patients were resident in towns and 10 came from the country districts.

Relative proportion of human and boune bacille Golden and Reeves state that viable tubercle bacilly are not demonstrated in the majority of their cases of calcified nodes examined by routine methods, but that occasignally the guinea pig test is positive. They do not say whether the human or the bovine type of bacilli were found. In Edinburgh, Wang found that 9 of 10 cases of alimentary tuherculosis were due to the bovine strain of tubercle bacillus Hart and Rahmowitsch in Germany obtained cultures from 6 cases of primary intestinal and mesenteric gland tuberculosis and found that 5 were bovine Topley and Wilson divide the abdominal cases into 2 types primary and secondary They

Primary abdominal tuberculosis is almost in variably due to the bovine type, but secondary ab dominal tuberculosis, which occurs most frequently as a late complication of pulmonary tuberculosis is generally due to the human type

Blacklock (3) found in 94 necropsies of children with primary lung tuberculosis, that all the infections were with the human type of hacilius, but that in 64 with primary abdominal tuberculosis, 54 (818 per cent) were infected with the bovine type. Apart from the 10 cases with actual or suspected pulmonary tuberculosis, and even in some of these, it may be assumed that most of the 239 cases were due to the hovine type of bacillus from infected milk.

Portal of infection (lesion of the gut) Still points out that in children there is very frequently tuherculous ulceration of the intestinal wall

Probably even in the mildest cases and in the earhest stage of tabes mesenterica, there is some tuberculous ulceration in nearly all cases. My own figures made whilst I was pathologist at the Children's Hospital shewed that of 132 cases with tu-

berculous enlargement of the mesenteric glands 107, that is over 80 per cent shewed ulceration of the bowel

He goes on to say that this ulceration should give bacilli in the stools and that bacterio logical examination sometimes yields conclusive proof of the presence of tuherculosis Again

The frequency of ahdominal tuberculosis there fore although it is a matter chiefly of pathological observation has a practical significance as a manifestation of the tendency to rapid and wide dissemination of tubercle in a child

In only one of our cases was an examination of the stools made for tubercle bacilli and it was negative

Blacklock (loc cit) writes

ulceration was noted

Primary tuberculous lesions were found in the abdomen in 84 (9 per cent) of the 2 126 cases under three and in 41 (110 per cent) of 374 over this age.

As regards the type of primary lesions in this series it was found that intestinal ulceration with caseation of the mesentenic plands occurred in 22 instances. All these cases were fatal and the majority occurred in 235 under 31 in the temaining 101 cases though the mesenteric gland were tuberculous no naked eye ovidence of intestinal

Apart from the various external constric tions produced in the bowel by the develop ment of peritoneal adhesions we found no evidence of the development of strictures of the gut itself i e strictures resulting from the healing of tuberculous ulcers of the mucosa. It must be assumed therefore that in the patients who survive, the hacilli have reached the glands without producing any permanent gross lesion of the bowel Many others have noticed this and experimental evi dence supports it Lymphatic spread from elsewhere is out of the question in most of these cases Presumably the tubercle bacilli either pass through the gut without producing any demonstrable lesion in it or such lesion beals well Similarly glandular tuberculosis in the neck may arise with no apparent (ton sıllar) lesion

The appendix was the only part of the gut examined on its internal surface and also microscopically. It may be endowed with a spicial degree of resistance by its lymphoid tissue. Small lesions of the ileum might have escaped detection There was only one case of tuberculosis of the ileum during the 10 years under review It has not been included in the series

The patient was a male (aged 2 years) who died from emaciation and pyrexia 8 months after a resection of a diseased tleum. The glands were very tensively affected with tuberculosis both in the caseous and calcarcous stares.

Cases of cecal tuberculosis are not rare, but none was seen in this series. Headed lesions of the occurn and especially of the right rolon would be difficult to exclude unless they were indurated. Lesions of the lower ileum are easily detected. It is not supposed that there was no initial bowel lesion, but no lesion was detected at operation.

The drophic appendix An atrophic appendix was suggested by Comer in 105 possible evidence or a healed primary lesion. He had operated on a male (aged 41 y cars), and found an atrophic appendix and a caseous mass the size of a walnut. Commenting on this he wrote.

The case just related illustrates the co en tence of an atrophic appendix and a large caseous fairs in the meanter; of the small intestine. It is possible that they represent indirectly the primary and secondary effects of the same di case. The tuber culous lesion in the intestine may have left no other mark behind it than the atrophic appendix.

This relationship does not seem to be borne out by facts. It would be expected that, in an occasional case at least, signs of active tuber culosis would be found in the appendix, as is found in from 5 per cent (Howarth and Gloyne) to .5 per cent (Mitchell) of tonsils. Out of the 93 appendixes examined microscopically from patients who had caseous and calcarcous mesenteric glands only one possibly luberculous appendix was found and this was doubtful Many atrophic appendixes also are found without any sign of abdominal tuberculosis. An arresting fact is that the atrophy begins distally and commonly results in obliteration of the lumen there.

It is possible that if the atrophic appendix represents the end results of old tuberculous appendicatis, of which fact no serial evidence has yet been published as far as we know, the bacilli are absorbed directly into the lym phatic system during the acute or subacute inflammatory stage I ater no sign of tuberculosis of the appendix itself is demonstrable Alternatively recurrent attacks of non-tuberculous, appendicular inflammation stimulate glands already tuberculous to become caseous, and later on they calcity Appendicular inflammation is associated with caseation in about half the number (Colt and Clark, 11) This view of the matter is new as far as we know, and seems to fit the facts better than the suggestion first made by Corner absence of tuberculous lesions in the appendix supports it and also the fact that a distally atrophic appendix, or an appendix showing signs of chrome inflammation, is found in such a large proportion of calcareous gland cases Of 172 cases of caseous and calcarcous mesenteric glands in this series, where the condition of the appendix has been noted, 112 showed either atrophic or chronic appendicitis a percentage of 65, which is very remarkable. Of these 19 were of the atrophic type and probably there were many more included in the chronic variety but were not specifically noted as such

Theories of calcification Klotz's theory of calcification whereby the fat in the caseous material is broken up and forms calcium soap to be replaced later by calcium phosphate and carbonate is generally accepted about nine times as much phosphate as carbonate The tendency to calcification would appear to be more marked in the abdomen than elsewhere in the body, but the cause of this is not clear. In the commonest situation for chronic tuberculosis, viz, the lungs, calcification seldom occurs The hilar glands are frequently affected with tuberculosis, and in children they often caseate, yet x-ray examination seldom shows calcification. The difficulties of examination of the chest as compared with the abdomen must be taken into account At postmortem examination calcification is not seen with any great frequency and when present is small in amount. Muir writes

In our experience however, a subpleural bealed or calcified nodule in some part of the lung other than the apex is relatively rare, as are also calcified bronchial glands

Blacklock's (2) observations support this Assuming Klotz's theory to be correct, an explanation of the frequent occurrence of the calcification in the mesenteric glands lies in the fact that they are likely to have a greater intermittent supply of fat than the other glands of the body The fat after absorption has to traverse the glands before it reaches the receptaculum chyli and is perhaps broken up in the process. Yet another possibility is that as the glands are in the portal circulation, the venous blood influences the process Its composition must be different from that in the general circulation after the excretion of the alkaline succus enterious and the absorption of acid substances from the bowel This would fit in with the theory of Wells who criticizes klotz's theory and suggests that calcification depends on physicochemical processes rather than on chemical reactions alone. calcium being present in the blood almost at saturation point and being held in solution by the colloids and carbon dioxide. In the region of dead tissues, where the tension of carbon dioxide is low, the blood is liable to deposit some of its contained calcium

Rate of calcification We are still largely ignorant of the rate at which calcification occurs Cascation must take place first and from the study of cervical adentis it would seem to be a very early process Bruce, writing on tuberculous neck glands makes the statement

Ninety nine per cent of all glands which have per eisted for three months and have attained the size of a bazel nut shew signs of caseation when removed by dissection

As caseation may occur without giving rise to any, or very few, and trivial symptoms the average length of histories is no real guide Even if it were, there is the possibility that appendicular pain would confuse the issue When the appendix is found to be normal at operation we are perhaps justified in some cases in assuming that the glands alone, cause the pain In some of the cases under review. mesenteric glands were found in process of calcification. Two such cases are the follow-

A female patient, aged 18 years, had had gen eralized abdominal pain on and off for a year, in monthly attacks. The pain settled later in the right that fossa and was unrelated to the periods. It was felt also in the vagina and leg. The appendix was normal. The x ray showed the glands so clearly that calcufaction must have been fairly advanced.

A male, aged 20 years, who had suffered for 6 months from attacks of pain in the right line fossa had at operation caseous glands. These showed up on the x ray films and the microscopic examination showed them to be calcified.

A third case showed neither caseation nor calcification

A male pattent aged 22 years had severe pan a year prevous to his operation. It was sufficient to double him up and lasted for 2 weeks. The pan recurred 3 months before the operation. The operation notes did not state the condition of the appendix unfortunately but there was a mass of mesentene glands proved by section to be tuberculous and there was no sign of calcination.

In the absence of definite radiological information, it may be assumed that the majority of glands are well on the way to com plete calcification at the end of a year after infection with tuberculosis Many have proh ably commenced to calcify within half that time Radiological evidence at intervals of a month in a series of patients of different ages would be most valuable. The dangers due to rupture of a gland or to the formation of adhesions and bands during caseation are considerable Perhaps one of the greatest safeguards which the patient has against them is the patchy distribution of the areas affected To the naked eye, and also in the x ray pictures of the condition, it is frequently seen that the masses of calcareous material are not in the first instance homogeneous but are distributed in many small centers which give the typical "speckled" appearance in the x ray film Parts of the gland at this stage feel "shotty" These multiple areas of caseation are not likely to cause so much gross peritoneal reaction as would a single large caseating mass The chance of a gland burstıng ıs also lessened

Calcified glands loose in the peritoneal castly Occasionally calcified glands are found lying free in the abdominal cavity. The most likely explanation of this is that the weight and movement of the gland gradually stretch the mesenteric overing until it is attached only hy a pedicle and eventually the pedicle gives way

A female patient aged 20 years had had pains in the side for 4 years. They were dull and inter mittent lasting for a day or so with a few weeks merval. During the previous 5 weeks the pain had remained constantly in the right side and had been accompanied by repeated nausea and emess The right or any was found to be prolaped and the appendix showed signs of recent inflammation. The small classed and take the form the properties of the state of the side of the state of the side of t

Calcified glands lying free in the pelvis have been found by one of us (G H C) on 3 oc casions during it years in a total of 2,541 ab dominal operations, but in many of the upper abdominal cases, the pelvis was not examined through the wound An appendix epiploica may become detached in a similar way (Colt, 9) and calcified utenne fibroids may also be extruded

It is interesting to speculate on the pathol ogy of a calcareous mass 34 inch in diameter observed on the free border of the liver near the gall bladder in a woman, aged 28 years, who had had stabbing pain on and off in the lower abdomen with radiation to the left breast for 18 months There were in addition some calcareous masses in the mesenter, Whether the original lesion was a caseating tubercle of the liver or, as would appear more likely, a mesentene gland which by some means had become attached to the liver and, later, pulled away from the mesentery, it is impossible to say as it was not removed. The gall bladder was normal, and nothing in the previous history pointed to an explanation

The cause of the symptoms Carson (7) was emphatic that a diagnosis could he made from pain alone

I believe that it is absolutely diagnostic the main symptom is pain and its character is absolutely typical. It is a sudden centralized abdominal pain severe enough to make the child cry lasting for about fifteen minutes or less relieved by pressure and hot applications, recurring perhaps two or three times a day and stopping as suddenly as it began so that in the intervals the patient is quite free. In some cases pains occur every day in others only at intervals of a month or o, the attack

lasting two or three days I do not know of any other disease in which pain of this type occurs

A strong odor of acetone in the hreath is characteristic of even mild attacks and is independent of yomiting

Many surgeons have sought to explain how the symptoms are produced

Golden and Reeves state

The mechanism of the production of symptoms by tuberculous mesentericlymphadentis, in the absence of previously mentioned complications is not clear It should be emphasized that a solidly calcified node seems to be just as able to produce pain as uncalcified actively diseased nodes

They also mention the possibility of a nervous origin. From the same paper other suggestions are that the symptoms are due to cicatnzation (Klein), or to involvement of nerve trunks in adhesions (Kantor). Kiss has shown that the mesentenc lymph nodes are traversed by nerves. Schloesman—quoted hy Golden and Reeves—considers that the rehef of pain following the operation is due to the severing of these nerve fihers and to the reduction of tension on the pentoneum, the colte-like nature of the pain indicating that the physiology of the intestine is ahnormal. The late H. Tyrrell-Gray, quoted in Braithwaite's paper, suggests another cause for the pain.

Inflammation of mesenteric glands, whether acute or chrome, may be associated with colic, which nearly always arises in the small intestine or the leocolic angle. The primary focus in the intestine may itself be responsible for the pain, as already described, but the glands themselves may also be responsible. For the inhibitory segment of the penstaltic wave normally exerts a physiological degree of tension in the mesentery during its passage, and, in the presence of inflamed glands, drags on these and causes pain

In this senes it is evident that there must only very rarely have heen any lesion of the gut itself. The tension everted by the passage of the inhibitory wave must he very slight and if such minute changes were able to give rise to pain, the passage of the intestunal contents alone, especially if they were inspissated, would be a more likely factor. The symptoms have been variously described by Auchincloss to pressure on the lymph and lacteal dramage, pressure on the blood vessels causing conges-

tion, pressure on the sympathetic and to reinfection (allergy) In fact there appears to he no one satisfactory explanation if a different theory is applied to each individual case. The symptomatology may depend to some extent on the situation of the glands

The following are three typical histories which have been selected from the cases under

review

A male, aged 21 years, at intervals of a day to 2 months for 11/2 years had attacks of abdominal pain The pain started to the left of the umbilious and a shooting pain went to the right. The first attack was acute and lasted 3 minutes. The pains were un related to food and were worse after a day's hard work. There had been no emesis but for the last month there had been nausea. The patient was more easily tired than he used to be His appetite was good and his bowels were regular. His previous health had been good. In the family history there was nil ad rem At operation in 1932, the appendix was found to be fibrosed throughout its length Two calcareous glands, one the size of a cherry and the other twice that size, were found in the mesen tery of the ileum and were removed Appendicectomy was also done. The questionnaire reply in 1034 was "Relieved of symptoms and hetter since operation "

A male, aged 28 years, for 4 years had suffered from midepigastric pain extending to the umbilicus, coming on 11/2 to 2 hours after food He always had heaviness and discomfort after food with flatulence and nausea but no vomiting. He had always suffered from constipation and required to take aperients regularly As a hoy, he suffered from indigestion Recently he had lost weight He had a good appe tite but was afraid to eat. The general condition was good There was some slight tenderness and hypertonus of the muscles around the umbilicus report of the harium meal was "D U +statim D U =one hour" One or two calcified masses were seen anterior and to the right of the fifth lumbar vertebra At operation a very marked sigmoid band was found and divided The cecum was very adherent to the lateral pelvic wall hy old fibrous tissue The ap pendix showed distal atrophy but was otherwise greatly thickened There were small shotty glands and three large calcareous ones at the root of the mesentery The abdomen showed general evidence of old tuherculous peritonitis. The pylorus was spasmodic The three large calcareous glands were removed, appendicectomy was performed, and 2 pints of saline left in the abdomen Three years afterward the patient was seen and said that he had heen very well since the operation. His appetite was good He had gained 6 pounds in weight The howels acted regularly, very seldom missing a day He had no indigestion The scar was sound

Female, aged 28 years, had had right sided abdominal pain for 3 to 4 years. Initially it was like a strain worse on lifting heavy weights. There was a dragging pain always in the right iliac fossa, which lasted a day now and then it was worse lately before periods and after food. There was no nausea or emesis Bowels opened regularly. There was some frequency of micturation when pain was bad Periods were regular. On examination there was found some tenderness with referred pain to the midepigastric region on palpation over McBurney s point At operation the appendix did not appear to he pathological. One calcareous mesenteric gland was found and removed and appendicectomy was done Four years after the operation the patient reported that she suffered from wind constipation and pain in the scar since a very bad attack of adhesions but that she had gained a stone in weight was in better health than before the opera tion and had been relieved of her pain

Intestinal obstruction caused by tuberculous abdominal glands. The potential dangers of intestinal obstruction caused by areas of pen torical reaction becoming adherent to sur rounding structures are well known. Two unusual findings in which multiple holes were found in the omentum and in the mesentery probably caused by the separation of such irm adhesions are not at all well known and would repay future investigation.

When the local tuberculous process is very active and a caseous gland ruptures local or general tuberculous peritomus ensues. The rapidity with which perforation becomes scaled off may tend to obscure its occurrence. The following case is suggestive of this, and being one of generalized tuberculous peritomis is not included in our totals.

A male aged 20 years suffering from left sided knife like abdominal pain which radiated to the other side and later settled down becoming a dull continuous ache was found at operation to have tuberculous peritonitis. The peritoneum was thick and tough. There was a large amount of free fluid in the abdomen. The whole of the mesentery of the small gut and the omentum were thickened. The gut was covered with small tubercles \umbers of enlarged glands were present. The perforation in the gland was not found. The abdomen was closed without any operative measures except the removal of the fluid and a part of the omentum for examina tion. The condition of the appendix was not stated The omentum microscopically was tuberculous Five years later this patient reported that he was better in health had been relieved of his symptoms had lost only 2 pounds in weight had a regular movement of the bowels without aperients and suffered not at all

The point is also confirmed by Riseley who records a case in which generalization occurred in it days

The patient, a boy aged 9; cars, was operated on for partial obstruction. The lower ideum was as herent to the ascending colon near the eccum and to a large perforated tuberculous gland in the meentery. Several smaller me entering lands were present. The peritoneum was normal. The abdomen was re-opened on the eleventh day for signs of recurrent obstruction and a few fresh addo nons were fixed. The whole peritoneum both systemal and the control of the state

Apart from strangulation in external herna, small gut obstruction is a comparatively raccondition. Internal hermas account for about half the cases and another quarter are due to bands and adbessons (Moss and McFetridge). The importance of tuberculous glands in this latter group must be considerable. Hurst states that bands and adhesions which result from local peritorities are the commonest causes of acute intestinal obstruction in children and young adults. The following cases of intestinal obstruction due to tuberculo is occurred in our series.

Icute obstruction There were 10 cases with 3 deaths The ages of the patients are of in terest from the point made in Carson's paper (6) that caseous glands are a frequent cause of intestinal obstruction in "young people" The ages were 12 18, 19, 22 (2), 24, 29 (2), 35 and 62, the average age being 26 9 years and the median 23 One of the patients had a history of appendicectomy 3 years previously, but at the second operation the appendix was found to be normal and the obstruction not connected with the old operation area. The first operation had been done for an appendix abscess Another patient had had a pyloroplasty for a leaking duodenal ulcer 4 years previously, and this operation also appeared to be unconnected with the obstruction which was due to a caseous gland

In 6 of the cases the glands were stated to be calcareous, in 3 caseous, and in r calcifying All the obstructions were of the small gut One patient had a condition of volvulus. The other cases were mostly due to internal strain gulation of the gut by bands adherent to the glands, to the mesentery in their vicinity, to the parietal peritoneum, to the omentum or more frequently, to the small gut itself. In it case the obstruction was due to the gut having become drawn up and kinked by the contraction of the mesentery which had become adherent to itself.

The glands causing obstruction were variously situated. One was in the transverse mesocolon, all the others were in the mesentery of the small gut, 3 were stated to be at the root of the mesentery, 2 being in the ileocecal angle, 1 at the middle of the mesentery, 1 at the "upper" part of the mesentery and in the other cases the exact position in the mesentery was not stated.

Four patients required operative treatment of the obstructed gut itself. Of these I patient recovered after resection of 3½ inches of ileum. The others died in I an enterostomy was done for gangrenous gut, in another a resection of 18 inches of ileum was done for gangrene, and in another, an entero-enterostomy for axial rotation of the lower end of the ileum was carried out.

Axial rotation of part of the intestine is a dangerous and difficult pathological condition to deal with and is caused by contraction of the fibrous tissue round a focus of inflammation attached to the wall of the gut It is generally seen in the ileum where the gut is more movable and where a vascular, multiple distribution of tubercle along the ileocolic artery is common The rotation seen in this series and in other cases has been anticlockwise, as one might expect from the anatomy there, and as much as one circle and threequarters in amount which no one would expect The operative unravelling is difficult and takes far too long to be warranted at any operation performed for acute or chronic obstruction The gut may be seriously depleted of its blood supply and easily injured. The quick detection of the actual pathological condition is apt to be a very difficult matter, chiefly because it is not well known. If it is made out soon, a safe course to pursue, when the obstruction is only recent and the blood supply sufficient is to perform a lateral anastomosis between the small intestine and the

cecum or ascending colon Later the loop of bowel may be removed if necessary Such a loop in this region may become water-logged and in a case known to one of us (GHC) was felt by the patient to flop over from time to time A large evacuation of watery feces followed this sensation Removal of the loop of bowel resulted in cure When, however, the obstruction is not of recent duration it will be necessary to perform a temporary enterostomy and later a resection Such a resection should always follow the relief of the acute condition as soon as considered safe, because the loss of strength is rapidly progressive from day to day, and the active digestion of the skin of the abdominal wall is constantly present and difficult to prevent The pain of this combined with the loss of nourishment can be permanently stopped only by a radical opera-

In the museum of Aberdeen University there is a specimen of the skin of the abdominal wall showing a large number of inflamed, warty processes caused by the action of the succus entericus continuing for 4 months. The pain had been severe Resection of the fistula cured the patient.

One patient developed acute obstruction of the sigmoid after an operation in which a gland had been removed. The obstruction was due to the adhesion of the sigmoid to the site of a freed Lane's band in the lower ileum. A third operation was later required for a second obstruction which was due to adhesion of the bowel to the peritoneum near the scar of the second operation.

Symptomatology The symptoms and signs were those usually found in acute obstruction. The duration ranged from 6 hours to 5 days, the average being 36 hours. Five of the patients had had similar attacks previously which were characterized by abdominal colic. Males were more frequently affected than females in the proportion of 7 to 3. The fifth day patient showed bluish discoloration around the umbilicus, which is also well-known to occur in some cases of ectopic gestation and acute pancreatitis.

In 3 cases the glands were removed at operation and all were calcareous In 3 cases the glands were scraped and the cavity peritonized—all were caseous In 3 cases—all calcareous—the glands were not removed In the other cases where the glands were calcafying there is no mention in the notes whether they were removed or not

Acute obstruction of the appendix There was a case in which the appendix was acutely obstructed by adhesions due to a tuberculous gland in the meso appendix

The extreme male and are

The patient a male, aged 14 years, had suffered for a day from right sided abdominal pain with nauvea and vomiting. At operation the eccum was found to be inced at the level of the umbuleus. The appendix was inflamed and retroccal. One inch from the base of the appendix there was an Sabaped kink caused by adhevons between small tuberculous glands in the meso appendix. On undoing the kink, in the appendix for a propendix of the

Subacute obstruction In addition to the 10 cases of acute obstruction there were 3 cases of partial or subacute obstruction The ages of the patients were 16, 17, and 18 years One bad a partial volvulus, to the left of the small gut at the duodenojejunal junction, caused by a large mesenteric gland A year previ ously he had bad an attack of pain similar to the one which led to operation. The second bad a coil of small gut passing through a loop between the omentum and a caseous mesen teric gland. There was no history of previous attacks of pain. The third was a patient who had had appendicectomy done successfully 2 years previously At the second operation. the small gut was found to be obstructed by an adhesion to a calcified mesenteric gland for 11/2 inches The appendicectomy scar was free from adhesions. The patient had had attacks which had occurred at intervals of 3 months, both before and after the appendi cectomy, and these attacks were similar to the one for which he required operation

Adhesions The incidence of abdominal to berculosis is much higher in the north than in the south of the British Isles It would appear that in any consideration of "the adhesion problem," the facts found to be true for the south are not necessarily true for the north Dingwall Tordyce in 1908, gives the following statistics.

Out of 23,030 children treated in the hospitals in Edmburgh and Glargon, the percentage of cases with abdominal tuberculosis was 3.9 The figures for the North Eastern Hospital for Children in London were 10,538 with a percentage of 1.3 with abdominal tuberculosis The figures for America are even lower, in 37 100 cases the percentage was 0.28

It is probable that a tendency to adhesions is present in patients operated on for other ab dominal conditions who have had a mild de gree of tuberculosis of the abdomen in child hood Adhesions were noted at operation in over a quarter of the total cases in the whole series of 230-caseous and calcareous The majority were found in the cases which later required further operation. The liability to their formation is evidently much greater than in non tuberculous persons. Some of the adhesions were due to old appendicitis and were not of a nature likely to give rise to any obstructive lesions, for example, small bands and filmy adhesions were noted between the appendix and the cecum and the surrounding peritoneum

Omentum adherent to sear One very prac tical point noted almost invariably in the re operation cases and well known to all sur geons, is the tendency for the omentum and bowel to adhere to the upper end of the scar, where operative trauma seems less likely to happen than at the lower end It would be expected that if adhesions were due to the organization of blood or serum they would form at the lower end of the scar, as any essusion would tend to gravitate downward in the Fowler position, but as light adhesions may form very quickly and remain when this position is assumed soon after the operation, this may not be a valid objection. As the wounds were sewed up from below upward, it might have been that the peritoneum of the upper end was more difficult of access, had been less freed from the superficial structures, more difficult to close effectively and more easily bruised than at the lower end It would thus be more hable to contract adhesions or even to gape slightly in a few days' time, leaving a bare area for the certain develop ment of adhesions But with good muscular relaxation these objections are not valid When the peritoneum is opened in a patient suffering

from adhesions, or in any operation in which the abdomen has been opened previously, it is therefore advisable to do this at the lower end of the incision if a clear spot is not visible elsewhere, and with a knife in preference to SCISSOTS

Potential obstruction Apart from the cases already given, some others may be briefly described to indicate the type of adhesions found as being potential sources of obstruction

A female, aged 17 years, who had had a typical history of recurrent attacks of right sided abdominal pain over a period of 3 years was found at operation to have a retrocecal appendix which was definitely inflamed in the distal third. A band was found running from the right border of the omentum to the deocecal angle where there were three shotty calcified mesenteric glands

A lemale, aged 31 years, had suffered from right sided abdominal pain for 8 years coming on in attacks before her periods. The pain radiated to the right leg and was worse on exercise. At operation the appendix was found to be normal. The omentum was tracking toward the pelvis where it was ad herent to a calcareous mesentene gland in the lower

loop of the ileum

A female, aged 35 years, had lelt sided abdominal pain for 3 months The pain was sharp and colic like and came on in attacks with nausea and emesis The attacks were becoming more frequent. The pain had been felt recently in the right abdomen. Ah dominal examination was negative apart from a positive Lockwood's sign (10) The roentgenogram showed a cafcareous mass to the lelt of the fifth lumbar vertehra. The appendix was hound down and adherent to the bowef in a few places. There were calcareous mesenteric glands in the root of the mesentery of the lower ileum. The glands were removed, appendicectomy was done, the sigmoid hand was divided and two pints of saline left in the ah domen Two years later this patient reported that she was in hetter health, had been reheved of ber symptoms and that the bowels moved regularly without aperients, but she suffered from loss of ap petite and weakness

A female, aged 31 years, had had an operation for a left inguinal hernia 8 years previously. She now complained of a swelling of a similar nature on the right side and of a dull constant ache in the small of the back passing down the back of the right feg She was inclined to he constipated A right paracentral incision was made, and there were found to he several adhesions between the coils of the small gut and two calcareous mesentene glands about the size of chestnuts One of these glands had a sharp

A female, aged 49 years, had suffered from indigestion, constipation, and anorexia for 20 years worse for the last o months She complained also of a constricting feeling in the epigastrium accompanied by tenderness Lockwood's sign was positive There was a tender palpable mass in the right iliac fossa At operation a large hand was found connecting the base of the galf bladder with the mesen-The stomach, duodenum, and gafl bladder were normal. The appendix was thin and atrophic and adherent to the eecum There was a large calcified gland in the mesentery of the lower loop of the ileum Appendicectomy, division of the mesenteric and of the sigmoid bands, which was fairly well marked, excision of the mesenteric gland, and closure of the abdomen were done, leaving in 2 pints of saline This patient reported 5 years later that she was "hetter in some ways," had gained in weight, had "not quite" heen relieved of her symptoms, still required aperient medicines, and still suffered from occasional slight pain and "wind"

There is little doubt that adhesions in the chronically tuberculous abdomen are as common as they are rare after appendicular obstruction or a ruptured tubal gestation in an otherwise healthy person. These experiences have shown that they are in no way related to such rough usage of the peritoneum as is occasionally inevitable when the muscles are active during anesthesia. Neither do they seem to depend on the stage of activity of the tuberculous process Intraperitoneal saline tends largely to prevent their formation, but in a few cases no such late beneficial effect is seen The fluid distributes any traces of blood which still adhere to the coils of gut and also separates the coils for a time This proceeding would appear to be unsound if the active parts of the glands were even slightly damaged during removal as it might incur the risk of general peritoneal tuberculosis. A patient who has required more than one operation for tuberculosis of the abdomen and remains with a bad result would be a good subject for a clinical test of papain (25)

Cases of appendicectomy followed later by operation for tuberculous abdominal glands and adhesions In an area where tuberculous disease of the abdominal lymphatic glands is frequent, difficulties often occur in the diagnosis and treatment of other abdominal conditions The common instance is appendicitis There were 13 such patients and they all had had appendicectomy previous to the operation at which the glands were removed Of the total, 4 were males and 9 were females

Two were associated with caseous glands and the others with calcareous glands. It is remarkable that in 10 patients the ages were under 22 years, the 3 others being 29, 31, and 30 years Six female patients required a third operation and one a fourth. In 7 of these cases, the right paracentral incision had been used, in 2 the gridiron, in 1 Battle s, in 1 an inguinal, and 2 were not specified. The smaller incisions are madequate unless a definite acute condition of the appendix is found and may then also be inadequate if tuberculous abdominal glands are the cause of it. The fact that in 10 of the 13 cases operation was done elsewhere makes it difficult to criticize, as the commence ment of the cases had not been seen. We were able to follow up all our own patients. No generalization can be offered unless it is that when in a young person the diagnosis of a supposed acute appendix is in doubt, the possibility of caseous or calcarcous glands being the cause should be remembered, and if opera tion is performed the right paracentral in cision should be used. This apparently adds somewhat to the risk run by the patient should acute appendicitis be the sole pathological

condition (8)

Cases requiring more than one operation

Ten of 31 re-operation cases chiefly the cartier
ones, had been done at other hospitals or in
other wards of the Infirmary, and it was diff

TABLE II -- RE OPERATION CASES

THE WAY		-	-	-	-		-	-
	Type of operation	Traced	Vatraced	Excell at	Cood	7000	Pred	Dead
Group	2 Appe direct my and glands 2 Adhesi n	4	ī	3				,
Group 11	Append oret my and glands Adne ions and glands	3					3	
Gr up	5 Appendicectomy 5 Glands and adhes ns 5 Adnessons	٠			,	,		_
Gro p	s Appendicectoms s Glands and adhesions	5	1	,	,	,		
Croup	Appendicationy and glands Adhe ions Adhesions	•	,		1			
Re man der	(lanous)	3		5		5	3	
	Totale				-			

Totals 31 4 12 4 7 7

cult accurately to collect all the required in formation. Some cases had followed the use of small lateral incisions for the appendiced tomy when the symptoms had really been due to the glands.

Table II shows the cases grouped according to the sequence of the operation and results flare of the bad results occur in Group II All were females and suffered from marked constipation. The disease had been progres sive. The one death was due to a flare up of old pulmonary tuberculosis.

The blood platelets in 6 of the cases were counted and the average was 504,000 There was apparently no great, if any, deviation from the normal

The most usual sequence in these multiple casts was (a) an operation for appendix disease, (b) an operation for adhesions and the removal of calcarcous glands, and (c) a last operation for adhesions or when there were only two operations, an initial appendicce tomy and later a gland and adhesion operation, or an appendiccetomy and gland removal initially followed later by an operation for

adhesions One patient who had 5 operations com menced in 1925 with an appendicectomy and gland removal In 1932 he had two operations, at both of which glands and adhesions were dealt with In 1933 he had another operation for adhesions and glands Finally, in 1934, he required a further operation for adhesions He was seen 9 months after the last operation and still complained of abdominal pain limited to the right side of the abdomen, and occa sional vornting. He suffered from marked constipation He did not consider that he had been relieved at all by his last operation, yet during the last month he had been decidedly better The scar was sound and, apart from the abdomen being slightly distended, nothing abnormal could be made out There was a psychological factor in this case as his home hie was not so congenial as hospitalization His general physique was excellent

One patient developed a ventral herma after the operation and it became strangulated to years later. The original incision had been a long and high one to explore the gall bladder and the patient was very obese. Sigmoid bands Of the 38 cases of caseous glands, there were 13 with sigmoid bands noted at operation Three were small, 5 were definite or present, 2 were well marked or prominent, and 3 were very marked The average age was 20 years and the median 19 The sigmoid band cases were associated with calcareous or partly calcareous glands in 6 cases There were 4 cases with atrophic appendices and the ages were 12, 12, 14, and 21 years There was 1 case with a Lane's link

and I with old perisplenitis Of the 184 cases of calcareous glands, there were 74 with sigmoid bands, 40 per cent Of these, 44 were small, short or slight, 22 were present or definite, 9 were prominent, broad, long or moderate, 15 extensive, marked or fairly well marked, 2 were very well marked or extremely marked There was a case with old perhepatitis, 8 eases with old pensplenitis, 3 with Jackson's membrane, 1 with a fold of Treves, and 4 with Lane's kinks Sigmoid bands were, therefore, commoner in the calcareous cases than in the caseous and were better formed, which, according to our view, merely illustrates a later stage in the life of fibrous tissue

In all cases the sigmoid band was divided where it was considered to be interfering with the mobility of the sigmoid All other adhesive bands such as Lanes' bands, omental adhesions, adhesions between the loops of gut and misenteric adhesions were likewise divided (Re operation cases are excluded in this group)

Histology of bands and adhesions In 6 cases, these bands and adhesions were examined for evidence of tuberculosis. Two sigmoid bands were negative for tubercle bacill. Two omental bands were examined. Both were composed of organized fibrous tissue—one rather vascular. A jejunal band was examined and found to be composed of very vascular fibrous tissue. One Jackson's membrane was examined and no evidence of tuberculosis found.

Etalogy A common sense explanation of the cause of sigmoid bands, Lane's bands and pelvic adhesions is that they are due to organization of fibrin left by the absorption of effusions and pools of lymph lying in the various

watersheds of the peritoneal cavity, such as the left concavity of the mesosigmoid Even the usually accepted congenital origin may he explained by hydroperitoneum during fetal life or in infancy They show a chordal as well as a radial contracture in their fan-like dis-On numerous occasions in this series (and in another series of some 1200 cases of chrome appendicitis), it has been possible to peel off the bands without injury to the peritoneum This is notably the case when the history is a short one and when the bands are flattened sheets of pale pink or yellow, organizing fibrin In eases of longer duration, in which firm fibrosis is present incorporated in the peritoneal surface, this is inevitably injured by removal of the band and has to be re-peritonized. There is evidence in some re operation eases that some degree of contraction may occur under the new peritoneal surface

Jordan, in a paper dealing with fixation of the iliae colon by acquired bands writes

This fixation can be shown to begin very early, indeed in infancy, and is due to constitution. It is one of the earliest results of intestinal stasis. This early commencement of fixation has led surgeons to conclude that the fixation is congenital, whereas it is, undoubtedly, acquired

The radiological demonstration in his paper should be consulted by those who have occasion to deal with these cases. Whether the stasis and constipation can be shown "significantly" to be due to old tuberculous perionitis will be for future observers to decide. We may be able to produce some small amount of evidence when the analysis of the larger series referred to has been completed.

Enlargement of pyloric glands, etc. Apart from spasm of the stomach and duodenum, glandular enlargements and thickenings may give rise to symptoms and signs of duodenal ulcer. At operation there is little difficulty in deciding the pathology in a typical ulcer or in a typical gland condition, but there is apt to be very great difficulty in some that are atypical. The mass is of so doubtful a nature, even after reducing some of the edema by pressure, that it is justifiable to open the duodenum. The x-ray diagnosis also depends largely on the abolition of spasm and may, in

consequence, he misleading In this series we have bad 12 cases in which doubt arose, and in another series duodenal ulcer had been confirmed radiologically in 13 cases, but when the duodenum was opened no ulcer could be seen It is possible that these abnormal thickenings occur in cases of low grade, or of chronic but still active, abdominal tuberculosis, and attention is drawn to them so that others may he able to add their observations in the future

Tuberculosis of the appendix Of 93 of the gland cases in which the appendix was examined microscopically, one was found to be tuberculous

A female aged 16) sears bad lower abdominal pain commencing the day before her admission. There was a history of many previous attacks of less seventy. The appendix contained concretions. There were calcufied glands in the mesentery near the appendix and a small luten cyst of the left ovary. The cyst was punctured the glands removed, and appendictorium was performed. The pathological report was 1) imphoid deposits in mucoway over prominent and active minute area instology very prominent and active minute area that should be appeared to the contractions appendiction. This case was untraced ductions of the contraction of the contracti

In one adhesions case tubercle of the appendix was found

A male aged 48 years was admitted on account of right sided abdominal pain of 61/2 hours duration which was relieved. He was operated on some a months later for attacks of colic like pain in the right that fossa with a vague generalized abdominaf ache nausea and intractable constipation. Oc casionally he had had very severe attacks of in digestion. At operation there was an extraordi narily well marked sigmoid band marked chronic inflammation of the appendix which was completely adherent to the cecum there were numerous pen cecal adhesions which immobilized the cecum to the lateral pelvic wall by dense fibrous hands one band ran from the lower ileum to the cecum. On section the appendix showed a medial stricture with a concentric ring of ulceration and marked distal atrophy All the proximal coats were hypertrophied section showed the ulceration to be tuberculous The sigmoid and also the ileal bands were divided appendicectomy was performed and 2 pinls of saline was left in the abdomen Four years after the operation the patient stated that he was now in better health, had been relieved of his symptoms had gained in weight and only occasionally suf fered from heartburn

Gangrenous appendicitis came on in a patient who was known to bave tuberculosis of the right lung

A female, aged 20 years, gave 2 3 days history of ahdominal pain of sudden onset becoming worse on the day of admission and accompanied by nausea She had been in bospital before for a similar attack which subsided. At that time she remained in hospital 3 months and was treated as a tuberculous case At operation, the appendix was found to be gangrenous the omentum wrapping it round and shutting in an abscess The cecum was edematous and showed signs of old inflammatory thickening Appendicectomy without opening the abscess was done and the wound was closed with drainage. The report on the appendix was chronic tuberculosis of the appendix with acute inflammatory changes" A week after the operation the wound was still dis charging hemorrhagic fluid (containing lymphocytes) and the patient was having marked pyrevia. At the end of a month the wound had healed, and she was discharged to the hospital she had been in previ ously Three months later she died of phthisis

Comment on operative technique. In order to test the results of this part of the work, every effort was made to secure personal continuity in the re-operation cases. By following up the cases every 3 months for many years, it was possible to ensure that few, if any, were missed unless they had left the distinct, and many of these were heard from

The older teaching that it is inadvisable to remove caseous or calcified mesenteric glands does not apply with such force today. In this series the glands were removed whenever the condition of the patient warranted it

The incision A right paramedian incision was generally used, the rectus being retracted outward The height of the incision was vari able depending on the position of the glands, the suspected presence of complications and on any other pathological conditions present, hut was preferably suhumbilical Carson used a midline infra umbilical incision. In only a few cases, when glands were numerous or small or when the operation was undertaken for acute appendicatis, were they not re moved When they were situated in a dan gerous position as regards the blood supply of the small gut, they were left at the time, but even in these cases they had often subse quently to be removed, especially when situ ated high up in the vertebral attachment of

the mesentery The subsequent histories of 2 such patients showed "much improvement" in 1 and in the other loss of weight, constipation, and backache

Care is always required The intimate relationship with the vessels and the fact that the latter may run through grooves on the gland surfaces or he in tunnels between them make for danger The higher up in the mesentery, and the nearer the lumbar spine, the greater the care required. The vessels are larger there and the greater depth in the abdomen makes the procedure troublesome Removal of the glands may leave a hole on each side of the mesenteric leaf and care must always be taken in closing it Both sides must be inspected to see that no raw area is Carson in his paper emphasizes this "After removal of the glands the greatest care must be taken to sew up the incision in the serosa" The repair should be done radially to avoid shortening the mesentery The vessels are often densely adherent to the glands The years being thin and stretched are especially difficult to avoid There was only one case in the series in which ligature of the vessels gave rise to any apparent disturbance of the circulation Usually the ligatures were lateral ones. In one case only was there a spreading hematoma of the mesentery due to the bleeding being very free and the source difficult to find

In removing the glands it is advisable for the assistant to grasp the bowel and the mesentery between the fingers and thumb of one or both hands so as to hold the glands forward for the operator This may be difficult or impossible if a gland hes near the vertebræ or if the mesentery has become contracted Removal is commenced by cutting the pentoneum over the gland or sometimes at its side The peritoneum is dissected back with the knife, the cutting edge being held toward the gland The smaller vessels are secured as they are cut, and unless numerous, the forceps are left on until the dissection is finished Some may prefer to dissect out the glands with scissors, but a longer time is required though the bleeding is less. The danger of tearing an adherent vein is greater by this method than hy using a sharp knife A good light is essential Fine linen is a good ligature and suture material for this work as it is less likely to slip than catgut The use of silk was discontinued in 1920 on account of its becoming rotten and uncertain when boiled with the slightest trace of alkali, and from its tendency to curl, whereas linen can be boiled many times in weak soda and water without deterioration It is remarkable how many vessels are cut even in the removal of a small inflamed gland, and it may be advisable to tie off a number of forceps before proceeding to the complete enucleation especially in the case of a large gland Great care should be exercised by the assistant to avoid putting any tension on the structures when the vessels are being tied or at any time later A point to be remembered is that with the mesentery on the stretch bleeding may not occur until the structures are relaxed and then it may be very free Tests should always be made Conversely, stretching the mesentery may eject a ligature from a short stump Carson states the difficulty mildly when he wrote "These operations may be very difficult and trying"

When caseation is present, or the gland relatively large, its content may be eviscerated. part of its capsule removed, and the edges closed and peritorized. In some cases of acute obstruction, drainage of the abscess for a short time seems justified. Some surgeons have advocated the use of omental grafts to cover any raw area left on the bowel wall and so prevent the formation of a sinus, especially when the gland is at the junction of bowel and mesentery There would not appear to be so much danger of sinus formation in the case of calcareous as in caseous cases The subsidence of inflammation allows a gland to resume its normal position in the mesentery at some distance from the gut itself

Of the 269 operations, 219 were done by one surgeon, 39 by another and the remaining 9 by deputy

Two of the patients had slightly keloid scars. This does not give the true number because less than half of the patients were examined during the follow-up, the others being traced by questionnaire. These keloids sub-

side with time independently of any radiation In the cases in which patients had only been traced for a comparatively short period, less than a year, there were many complaints of burning, tingling or tichiness in the scansome of which were keloid in the earlier stages, but there was no case with a scar which had remained permanently hyperesthetic. Glycerine relieves the tiching

Three patients in the series had ventral hermas in 1 after 1 operation, in 1 after 2 operations and in 1 after 3 operations. These were 3 cases of general weakness of the lower abdomen. One patient had an incipient right inguinal herma after a right paracentral in cision. In 6 cases there was widening of the skin but none of the deeper layers.

TABLE III -- RESULTS OF OPERATIVE
TREATMENT

Natural care	Excel I nt	Good	Poor	Rad	Ded	Total
Caseon	1 27	3	1		- 5	36
Calca sous	100	7	6	8		144
Re-operation	111	4	,	7	1	31
Totals	148	1 14	14	15	10	211

The 10 deaths are accounted for as shown in Table IV

It is evident that the removal of tuberculous abdominal glands has not met with successful results in all cases thought would seem that the results are better the more complete the removal especially if done in the intervals be tween attacks. Removal during the process of calcification seems to be unsatisfactory and tends to the formation of adhesions. If there is radiological evidence that calcification is still in progress the case should if possible, be continued without operative interference and operation may not ultimately, he found necessary. It is to be hoped that the use of papain (22) in future cases will provide a welcome improvement.

Possibility of shrring up luberculosis elsehere. It has been suggested that the removal of these glands is likely to stir up old quiescent lesions either in the abdomen or elsewhere One of Carson's patients developed phthisis and recovered, and another developed phthisis and died in months after operation. There were 5 cases in this series which might point to this possibility.

CASE 1 A female aged 28 vears dred from philms 4.9 ears after the gland operation. She had a very strong family history of tuberculosis—6 of the family of to had died of tuberculosis—5 of long disease and 2 of intestinal. The patient had a casest ing gland the size of a hen segg. She had suffered from pulmonary tuberculosis for 3 years previous to her operation.

CASE 2 A male, aged 44 years, had cholecystee tomy for stones Several calcified glands in the fleocecal angle were removed. He developed phthuss

and is now under treatment

CASE 3 A female, aged 12 years, was su pected of lung tuberculoss. She took 2 years to convalesce from the operation at which a fairly large number of tuberculous glands were found and removed CASE 4 male aged 34 years, died on the fifth

Case 4 A male aged 34 years, died on the fifth day after operation for adhesions Death was due to stirring up an old phthisis The gland operation

had been done 2 years previously

CASE 5 \ Iemale aged 23) ears was admitted to a medical warf for 6 months following the operation with tuberculosis of the lung \ 1 to peration a large calcareous gland was removed from the root of the mesenter:

A male aged 12 years had all types of tuberculous mesenteric glands as well as tubercles in the lower ileum. He died some time after the operation from phthysis.

The last patient is not included in the series He had generalized peritoneal tuberculosis surrounding the glands and very many small glands in all stages of activity

FAMILY HISTORY OF TUBERCULOSIS

1 J C aged 16 years, 1932, mother died of tu

herculosis

2 B.W. aged 34 years 1032 mother and siter

phthisical Patient also had le ion of lung at time
of operation, and treatment for lung disease 15

years previously

Father died of pulmonary tuber
culosis

3 J R aged 12 years, 1931 (brother of B R below 1929) four of family all delicate in youth, with also a family history otherwise suspicious of tuber culosis

4 B R aged 17 years 1929 (sister of J R above)

5 E D aged 17 years 1931, mother suffers from tuberculosis and there is a very strong family history of tuberculosis 6 M P aged 23 years, 1931 (brother of W P

below) suffered from calcareous glands in abdomen
7 W P aged 23 years 1925 (brother of M P
shove)

Surg	Aoe and index	Type of case	Type of operation	Cause of Death	Surviva! period
2	1 29 (F R 1932)	Caseous gland and 2 duodenal ulcers	Removal of gland and appendix posterior gastrojejunostomy	Septic peritonitis and paralytic	1 wk
1	2 24 (R B 1931)	Caseous gland Small gut obstruction	Entero enterostomy gland scraped	Postoperative lobar pneumonia	1 day
1	3 52 (J Y 1928)	Caseous gland Acute appendicates	Appendix and gland removed	Peritonitis	5 days
ī	4 28 (G W 1932)	Caseating mass in mesentery	Appendix and part of mass removed	Postoperative shock	1 day
1	5 28 (E V 1915)	Caseating gland	Removal of gland and appendix	Phthisis	3 3 IS
ī	6 62 (W C 1925)	Calcareous glands acute intestinal strangulation	Resection of 18 inches of small gut	Postoperative shock	2 days
ī	7 29 (J M 1932)	Intestinal strangulation Gangrent of gut Calcareous glands	Enterostomy	Postoperative shock	Few brs
ī	8 43 (J W 1929)	Calcareous glands Slight adhesions	Appendix and glands removed	Burst wound—postoperative peritonitis	rr days
:	0 ISC 1930)	Mitral stenosis Calcareous glands	Removal of glands and appendix	Postoperative hemiplegia Acute heart failure	2) [3
ī	(B W 1930)	Adhesions Calcareous glands Potential bernia of mesentery	Appendix and glands removed repair of mesentery		
	(B W 1932)	Postoperative adhesions	Freezno of adhesions	Flare up of phthisis	6 days

Fotal cases. otal operations Deaths due to operation 5 to strangulation 3 to phthisis 2 Total 10

- 8 A N, aged 8 years, 1929-30 (sister of W N below), suffered from calcareous andominal glands and required a second operation for adhesions and glands
- 9 W N, age 12, 1928-29 (hrother of A N ahove), also suffered from calcareous mesenteric glands and required 2 later operations for adhesions One other member of the family died of tuberculous meningitis, others had been under treatment in a hospital for tuberculosis and an uncle had a tuberculous lung

ro M B, aged 12 years, 1925, brother had weak chest, very possibly tuherculous

11 E N, aged 28 years, 1925 Six of 10 brothers and sisters died of tuberculosis, 4 from disease of the lungs and 2 from intestinal disease. Two of father's sisters also died of tuberculosis

Thus a more or less strong family history of tuberculosis was obtained in 11 cases Six of these cases were brother and sister from 3 families Five of the cases were suspected of extra-abdominal lesions and are included in the "personal history" series brothers and sisters died of tuberculosis and of the 6 deaths 2 were due to abdominal tuberculosis Another patient had almost as strong a history, the father died of tuberculosis and the mother and sister of the patient were phthisical

PERSONAL HISTORY OF TUBERCULOSIS

1 A L, aged 23 years, 1932 At the time of the operation was suspected of having renal tubercu

losis 2 B W, aged 34 years, 1932 Was in convales cent home 15 years previously for phthisis Sus pected to have lesions at right apex at time of operation Died 6 days after the operation from "flare up" of the old phthisis

3 M P, aged 23 years, 1931 X ray examination at time of operation showed the left lung to he ?fluid Postoperative treatment for 6 months for phthisis

4 J R, aged 12 years, 1931 Delicate in youth Prominent root shadows in x-ray films

W F, aged 42 years, 1931 X ray films showed a hlurred and mottled right apex with prominent root shadows

- 6 E D, aged 17 years, 1931 Always weakly and suspected of having phthisis X-ray examination showed very prominent root shadows and pen hronchial fibrosis. He had an abscess over the sacrum this year and it was suspected to he tuherculous
- 7 L F, aged 16 years, 1929 Had neck gland incision 7 years previously

8 B R, aged 17 years, 1929 Had cervical tuherculous adenitis as a child

9 D F, aged 16 years, 1929 Right apical lung disease Tuherculous

10 W N, aged 12 years, 1928 Had pleurisy twice Thin pale faced Some pulmonary fibrosis shown in the x ray Was in hospital previously for 3 months and had latent tuberculosis

11 J M aged 47 years 1927 A piner all his life Had pleurisy five times

12 G W, aged 28 years, 1926 Five years previously had had an operation for usoas abscess This patient had a tuberculous salpingitis as well as calcareous glands)

13 J I, aged 19 years 1925 Lyndence of chronic pleurisy right base

14 E N, aged 28 years 1925 Cough at times

and a very strong family history of tuberculosis There does not therefore appear to be a very

marked hability to the development of the glandular type of abdominal tuberculosis co incidently with or following on other tuber culous lesions

Ot the total number of 2,9 cases, there were only 14 patients who from their past histories. or from examination of their present condition were actually known or suspected to have had other tuberculous foce Of these, 10 were suspected to have had pulmonary tuber culosis which in 3 cases was still active. Two had had operations for tuberculous neck glands, one a psoas abscess 5 years previously and another was suspected of having a tuber culous kidney and epididymis at the time of the operation Thus of the series of cases there are only , patients or at most 4, in whom tuberculosis was present in an active state clsewhere than in the abdomen at the time the operation was performed

SUMMARY AND CONCLUSIONS

It appears from the literature that the glandular type of abdominal tuberculosis is a severe and often fatal disease in infants and young children notably when the bowel is ulcerated that in those that survive, or be come infected later in hie, the disease runs a natural course toward calcification and cure This course may be a troubled and dangerous one It is difficult to correlate the effect of any particular kind of treatment with the progress of calcification, but serial roentgen ography may help to clarify this factor in the future

The cases of 230 patients admitted consecutively into a general surgical ward have been reviewed for this enquiry. Family and personal histories of tuberculosis were given m 25 cases, but in only 3 or at most 4 of them was tuberculosis present in an active state elsewhere than in the abdomen at the time of operation There appears to be very little danger of causing general or local tuberculosis by an operation for the removal of the ma pority of tuberculous abdominal lymphatic glands

Excluding one doubtful case, no evidence was found in the abdomen of the portal of in

fection

The administration of intraperatoneal saline at the conclusion of the operation tends to prevent the formation of adhesions in abdominal tuberculosis

The adhesion threshold in abdominal tuber culosis is a low one. When the precautions in common use for minimizing operative trauma are adopted there is evidence that within such limits the formation of adhesions does not depend on peritoneal intury or on the stage of the disease

Re operation should be avoided if possible until 2 years have clapsed from the time of the

last operation

The connection between the atrophic ap pendix and tuberculous abdominal glands is discussed

No tubercle bacilli have been found in the adhesions, sigmoid bands, omental bands or lackson's membranes when they have been examined The formation of such bands and membranes is probably due to the organiza tion of fibrin in pools and collections of lymph The various stages of their formation ma) easily be observed

Fvery effort should be continued to rid the milk supply in small districts and in large communities of active tubercle bacilli

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CANCER OF THE BREAST

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PRESENTING this paper I want to pay a ribute to the late Robert B Greenough, whose recent death has resulted in one of the greatest possible losses to students of cancer and to surgeons in general A very large part of my personal interest in, and knowledge of, cancer has been derived from his stimulating teaching. In writing this paper I have tried to make it as much as possible one that would meet with his hearty approval. As you will see I will quote extensively from his writings.

CURATIVE SURGERY

One would think that during the 43 years since Halsted published his great paper de scribing the essentials of an effective technique for operation for cancer of the breast his prin ciples would have become either universally used or universally discarded. During the in tervening years hundreds of papers have been published concerning the end results in pa tients who have undergone this or essentially similar operations. Very few papers have been published which show even approximately as good results when less radical operations have been done Grace of Brooklyn, however, has recently published a paper in which he claims good results from local mastectomy claims 44 per cent of cures in 40 cases, but ad mits that 80 such operations were performed, and that the follow up is only 50 per cent complete Obviously, although he does not say so, he made no serious attempt to get the end results on his failures by consulting the death records at either the city or state departments of vital statistics. Is it honest for a man to compile a table such as he has, in which he compares his percentages with those of Green ough and others (3, 4, 5, 6, 8, 9) who follow up over 90 per cent of their cases, and then to consider the remainder of his patients to be dead of the disease?

From the Cancer Commission of Harvard University Read before the section meeting of the American College of Surgeons Halifar Nova Scotta, May 20, 1937

In addition to Grace many surgeons, and among them not a few other members of the American College of Surgeons, perform many non radical operations in an attempt to eure caneer Many may honestly be confused by the fact that certain publications of promment surgeons and pathologists have led them astray An instance of how this may occur may be found in a very important paper by Allen Graham This recent paper is used as an example and is not the sole instance that might be cited in this connection He states. "In a small percentage of cases, simple mastectomy is adequate treatment provided the entire breast is removed Needless to say, these are cases in which the process has not progressed to the formation of a gross tumor nodule " He then goes on to hout still further the cases in which he makes this recommendation by in sisting on a complete gross examination by a competent pathologist to rule out gross tumor This advice, therefore, applies to a very small number of patients who undergo operation primarily for some benign breast condition, and prohably in many instances different pathologists would disagree as to the actual presence or non presence of cancer This ad vice can do no harm if it is followed exactly as given Itislikely, bowever, that careless readers would not take in the qualifying statements, but would quote Graham as an authority for doing things of which he would completely disapprove In the next paragraph he goes on to say, "That an amputation of the breast and axillary dissection without removal of the pectoral muscles is adequate treatment for a certain group of patients has been proved to our entire satisfaction " This group he later defines as "early cases without evidence of axillary metastases "

How about this? Two aspects of it will be discussed First, can one tell by physical examination whether or not axillary metastases are present? In the more recent papers by the members of the staff of the Harvard Cancer Commission this particular point has not been

considered, but it was considered by Greenough and Taylor (6) Therefore, to secure a modern group of cases a consecutive series of 50 recent cases at the Huntington Memorial Hospital has been studied with this aspect in mind These cases are all examples of primary, operable breast cancer which was proved by pathological examination, and all these patients were operated upon promptly after physical examination had been completed. The examinations were made hy various memhers of the surgical staff, but in all cases the examiners had had at least 10 years' experience in tumor clinic work at the hospital and each had worked also at one or more of the following hospitals Massachusetts General, Boston City, Pondville, and Palmer Memorial The operations performed were all radical procedures and consisted of mastectomy, removal of both muscles, and of the axillary contents, all in one piece. This study is shown in Table I

This table shows that the pre operative accuracy of diagnosis when glands were thought to he involved was 91 per cent and when they were thought not to he involved it was only 61 per cent A similar study was made hy Greenough and Taylor (6) in 1934 from the cases at the Massachusetts General Hospital

In this instance it is likely that most of the recorded pre-operative examinations were made by house officers. However, although the preponderant type of error is different, the errors of clinical estimation are essentially the same in percentage as in the later series. Here the examinations were only 68 per cont correct when glands were thought to be involved and 79 per cent correct when they were thought not to be involved. Table II shows hoth these series on a percentage hasis.

With these figures in mind it is clear that one cannot be at all sure on examination whether the nodes are involved. It is admitted that perhaps half of the cases referred to would be considered so advanced hy Graham that he would not consider saving the muscles, but the other half were certainly early cases, as I read his criteria, and the percentage of errors in such cases, while it might be smaller than the percentages tabulated, would still be sufficient to make one think that a radical operation is warranted hecause

TABLE I —CANCER OF THE BREAST, HUNTING-TON MEMORIAL HOSPITAL, 1931-1936 COM-PARISON OF PHYSICAL ENAMINATION AND PATHOLOGICAL ENAMINATION OF AVILLARY LYMPII NODES

'hy sical examination	Pathe exami		
•	Positive	Acgative	Total
Positive	20	2	22
Negative	11	17	28
•	_	_	
Total	31	19	50

TABLE II —CANCER OF THE BREAST, ACCURACY
OF PRE-OPERATIVE DIAGNOSIS OF AVILLARY
METASTASES

Pre-operative diagnosis Positive Negative	Vassachusetts General Hospital 1921-1913 Correct per cent 68 79	Memorial Hospital 1931-1936 Correct per cent 91
Average, per cent	74	76

of the likelihood of the presence of involved glands. It is not doubted that an axillary dissection can he performed by a good surgeon without removal of the muscles, but is it as good a dissection, and can it ever be as complete a dissection as can be done by the same man when the muscles are removed?

The second piece of evidence against leaving the muscles is found in the occasional patient who suffers a local recurrence in the muscles and not in the glands following complete simple mastectomy for "early" carcinoma Two such patients have been seen at the Pondville Hospital this year (10) Further evidence is seen in the important studies made hy the late Dr Wainwright (13), who before his recent death contributed so much to the study of cancer and its spread. It may be held that the radical operation is too dangerous This should not be true In properly selected cases the operative mortality should he in the neighborhood of 2 per cent or less, as has been reported for many years in the Harvard Cancer Commission publications (3, 4, 5, 6, 8, 9), and from many other clinics For all these reasons we disagree with Graham in advising non-radical operations upon even the few patients with proved cancer of the hreast for whom he advised them We do not believe it is possible to pick out the few patients for

TABLE III -CANCER OF THE BREAST Comparative Results by Years (a)

Period		Duration o
1894-1904	19	3
1911-1914	27	5
1918-1920	30	5
1921-1923	35	S
1024-1020	41	5
1927-19 9	43	Š

whom we admit this procedure would be safe In the case of individuals sent to the hos pital for postoperative x ray treatment within i month following a simple mastectomy, no x ray treatment is given but 1 radical operation is done. In half of these patients defimitely involved nodes are found. Where would they be without having had a removal of the nodes? Some surgeons also claim that there is disability from the loss of the muscles. That has never been seen in the many paturats upon whom operation was performed at the hospital

SELECTION OF PATIENTS TOL RADICAL OPERATION

A most important part of Graham's paper shows frankly how many radical operations were performed in a futile attempt to cure the incurable. We agree complictly with him that such patients should never have radical procedures and should scliom undergo any surgery bevond a biopsy. A patient who complains of a breast tumor has the following course, of study at the Huntington Memonal Hospital

After a preliminary history has been taken, a careful local examination is made. If the following conditions are found the case is con sidered to be inoperable. A fixed mass, fixed axillary nodes, any involved supraclavicular nodes, wide skin involvement subsidiary skin nodules, edema of the breast and edema of the arm It is to be noted that a large tumor, locally fixed to the skin or not, and locally ulcerated or not does not in itself make the situation inoperable. In addition, movable axillary metastases do not do so After this examination is completed all patients in whom there is a positive or likely diagnosis of cancer are subjected to the following a ray examina tions chest, lateral view of the thoracic and cervical spine, anteroposterior view of the

lumbar spine and pelvis, lateral view of the skull It metastases are found in any of these plates the case is also considered to be inon erable If no metastases are found an estimate is made of the patient's general condition, and particularly of the circulatory system and respiratory tract Complete physical exam mation is done and occasionally evidence of intraperitonical extension is found. Operation, of course, is never performed in such instances If the patient is in good condition an appoint ment for radical operation is made and the operation is performed the day after the pa tient's admission to the hospital. If the patient is a poor risk, he is put to rest in bed, studied medically, and treated when indicated for a few days in the hospital By this regimen a patient's general condition can be so improved as to enable him to undergo a radical

operation
In some cases the diagnosis as to the presence of cancer is a borderline one. In these instances the course of study mentioned is carned out and the patient is prepared for radical operation. An incision is made directly over the tumor, which is incised, or removed with a fair margin of tissue. Immediate frozen section diagnosis is made. If this shows career the wound is packed with formalinized gaize and is carefully sutured, the instrumentagowns, glowes, and drapes are discarded. The shan is newly prepared and the radical operation is proceeded with

TREATMENT OF THE POSSIBLY

Under the teaching of the late Dr Green ough, the Halsted musion has not been used for many years. However, we do not disapprove of a properly done Halsted operation. We merely think that in our hands the following operation, which complies in every way with Halsted's objective, is more easily performed and affords better possibilities for plastic closure when large amounts of skin have to be removed. The transverse axillary or Rod man incision is used. The avilla is dissected first, after the two muscles are divided near their inscribus. When this dissection is complete, the breast is removed in one piece with a windle and the avillary contents, muscles, and skin. The

shin is removed sufficiently widely so that at times a shin graft is necessary. Recently electrocoagulation rather than tying has been used for all bleeders other than the branches of the axillary vein and artery, but the entire dissection is done with a scalpel or scissors. Coagulation of the bleeders saves much time and results in at least as dry a wound as the former method. An axillary drain is used

Pre-operative x-ray treatment is not used Definite proof of its value is not clear to us as yet. We are, however, watching certain work in other institutions with great interest as it is possible that a valuable method of giving this treatment may be worked out shortly. Prophylactic postoperative x-ray treatment is given over the operative site to only a few patients with a highly malignant cancer. However, all women who have not passed the menopause are sterilized by x-ray (11)

TREATMENT OF THE INCURABLE PATIFINT

This group is made up of patients with ex tensive disease as outlined, rarely of patients with operable local lesions who cannot by any preparation be put into proper condition for the operation, and patients with recurrences following radical surgery These patients are all given high voltage x-ray treatment to the local lesion and all known metastases Quite large doses of x-ray are given and if the patients are from out of town they remain in the hospital during the course of treatment Ra dium is used practically not at all. The lack of useful palliation or cure by inserted platinum needles (Keynes) containing radium has been reported by McKittrick (7) (12) has already reported the results of such treatment at the Pondville Hospital and elsewhere Very few non-radical operations are done on a palliative basis, as has been recommended frequently in the past and is being done rather extensively at present in other institutions X-ray treatment has been found to be followed by healing of the local lesion which is kept in check during the time the patient remains alive Although, as stated above, we pay bttle attention to either preoperative or postoperative x-ray treatment we think palliative treatment by this means for the patient who is not a good operative risk or for the patient with recurrence after complete operation is of the greatest value. Within the last 2 months the first treatments on a new one and one-half million volt machine of radically new design have been started. These are still purely experimental and we are not as yet prepared to give a report on the immediate results of this treatment.

RESULTS OF CURATIVE OPERATIONS

The Huntington Memorial Hospital during its existence has been an experimental institute It has very few beds for house patients and these bods have been used primarily for patients receiving various kinds of radiation treatment, experimental or otherwise tients in need of standard surgical procedures have been transferred to other hospitals most cases they were transferred to the Massachusetts General Hospital One of the largest series of papers dealing with thoroughly followed operations and uniformly presented cases is that of Greenough and his coworkers, already mentioned Table III, which I am including in this paper, appears in the final paper of Greenough's series, and presents what is accomplished by following the principles herein stated

Before going back to the original papers any younger surgeon might think that the reason the results improved so much between the first and second interval was because the radical operation was less frequently done in the first period As a matter of fact, this is not true Dr J Collins Warren, who was the founder of the Huntington Memorial Hospital, was a leading surgeon at the Massachusetts General Hospital then, was greatly interested in radical cancer surgery, and he and his colleagues all adopted Halsted's principles in 1894 when they were first published The percentage of radical operations was as high in the first series as in any subsequent one We must therefore look elsewhere for these improved results. Although the operative mortality was slightly higher in the early period it was not enough so to make this dıfference

The whole difference may be accounted for hy a stricter choice of patients to whom the chance of operative cure was offered. This was

accomplished in two ways First, by assigning such patients to a few individuals instead of having them spread among the whole staff This accounts for most of the improvement between the first and the second series This improvement was really greater than the difference between 19 and 27 per cent because in any series studied at a 3 year interval there will be a considerable further loss by the time 5 years have passed

During the years of the third and fourth series x ray study, first of the chest and later of the bones, began to be used to eliminate some cases previously considered to be oper able By the time of the last paper this had become absolutely routine. All the improvement in results of treatment shown in this series of papers can be attributed to three (1) better choice of cases, (2) con centration in the hands of experts, (3) larger proportions of early cases

SUMMARY AND CONCLUSIONS

- Patients with suspected cancer of the breast should be very carefully studied before the course of treatment is decided upon This study includes complete history, physical examination and x ray examination of the chest, spine, pelvis and skull
- 2 Following this study the patients should be separated into two classes (1) those with a chance of cure (2) those without a chance of cure
- The former should undergo radical pro cedures without previous radiation treat ment Postoperative x ray treatment is not a necessary part of the routine for all patients
- The patients classed as incurable should be given powerful doses of x ray, and no sur gery and usually no radium

- 5 Patients with recurrence following rad ical operation should have palliative treat ment by x ray and, occasionally, by radium
- 6 When patients are treated in this way 43 per cent of those operated upon should remain "cured" for 5 years Of these, 73 per cent of the patients without positive nodes on patbological examination and 25 per cent of tbose with positive nodes are "cured"

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FIVE YEAR END-RESULTS IN THE TREATMENT OF CANCER OF THE TONGUE, LIP, AND CHEEK

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▼ I IS axiomatic that the efficacy of a therapeutic procedure must be determined not by the number, but rather by the percentage of cures obtained by its use Obviously, the end results or the percentage of permanent cures in diseases such as cancer may not be calculated except after an extended period of observation so as to preclude the probability of late recurrence However, another factor must be taken into account in all calculations of end-results, namely, the make-up of the group of patients upon whom the calculations are made Unless the clinical material is of uniform average quality, as regards the stage of advancement in patients with cancer, comparative end-results are meaningless. This applies particularly to the practice of selecting only those patients who are "operable," "early" or otherwise favorable

To be truly representative, a group of cases upon which end-results are reported should consist of a consecutive series of all patients in any and all stages of the disease, whether primary or recurrent, as they present themselves for treatment Such a concept is, of course, not new, but it is honored more often in precept than in practice The only permissible deductions from the total are those cases in which the eventual results of the treatment for cancer cannot be determined by reason of death from unrelated causes, and those in which patients are lost track of without recurrence after a reasonable period of freedom from disease (1 year) It will be conceded that neither of these modifying factors is capable of control by the physician nor can they be influenced by the efficacy of the treatment These factors will be discussed more fully later

The end results reported in this communication were calculated on the biss of the foregoing standards and represent a sincere effort to record the actual statistical data as regards.

Presented before the Fifth International Congress of Radiology Chicago III September 1937 From the Head and Neck Service Memorial Ho pital the possibility of cure and the prognosis in certain anatomic forms of cancer in our clinic

THE LENGTH OF THE POST-TREATMENT OBSI RVATION PERIOD

A 5 year period of freedom from recurrence is at the present time generally accepted as a reasonable basis for computing the percentage of permanent control in cancer The selection of a 5 year period for all varieties of cancer is somewhat arbitrary, since it is well known that the possibility of late or remote recurrence differs considerably in the various anatomical and histological forms of the disease For instance, it is common knowledge that cancer of the lip or mucosa of the check rarely recurs after even 3 years, while in other varieties, such as anaplastic cancer of the pharvny. cancer of the breast, and melanoma of the skin, disseminated metastases may develop 10, 15, 20 years, or even longer after control of the primary lesion

One must concede, therefore, that strictly speaking, absolute cure of cancer is not assured until the patient has survived for a period longer than that of any recorded instance of recurrence in his particular anatomical and histological variety of the disease. However, statistics based on such long periods of survival would be of little or no practical value in evaluating the comparative merits of several methods of treatment. By the time 20 year, 15 year, or even 10 year cure rates had been determined, the treatment methods employed would necessarily have been considerably modified or superseded, and the series of cases upon which the calculations were based would be greatly reduced by deaths from other causes Under such severe standards, we should be deprived of the opportunity of modifying and improving our methods on the basis of the experience and results of our contemporaries During such a long period, the individual investigator himself might

have passed from activity into retirement A comparison of the methods in use 15 or 20 oyars ago would be of greater histonic interest than practical value. Therefore, it seems likely that considered opinion will settle upon the standard of a 5 year cure! as a logical compromise between absolute fact and average probability.

THE LENGTH OF THE PERIOD COVERED IN SINGLE REPORTS

Since it is inevitable and proper that the treatment methods in any disease should evolve and progress, statistical reports on groups of cases ranging over periods of 10 to 20 years can be of little practical interest, except in the study of the clinical course of the more rare diseases. Most reports covering such long intervals serve mainly to emphasize the personal achievements of a single individual or of one institution, and as such, have a histonic rather than a practical significance

A report of end results is of little more than academic interest unless the patients upon whom the statistics are computed were all treated within a definite, limited time period, preferably short, so as to cover no more than a 5 to 10 year interval. To be of timely interest, the end report had best be made timmediately following the completion of a 5 year observation for the whole group, as for instance, a series of patients treated during the several years immediately preceding 1930 should be reported in 1935, etc.

The grouping of cases treated over longer penods in one report suggests a statu rather than a progressive attitude toward the cancer problem. For these reasons, it has been made the policy in our clinic to limit statistical reports to groups of cases in which patients were treated over shorter penods (about 5 years) so that in the future, one may have a standard with which to compare the actual value of any subsequent development or improvement in technique.

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COLLECTED AND SELECTED CLINICAL MATERIAL

To be fully informative, a series of cases used for statistical purposes should be un selected-that is, it should he made up of all patients in any and all stages of the disease who have been observed within a specified period The cases must therefore be consecutive and collected, rather than scattered and selected The selection of cases on the basis of operability or probable curability renders a report of the end-results of limited value, since there can be no uniformity of individual opinion as to what constitutes operability or curability, and it is obviously difficult, if not impossible, to avoid a personal hias in choos ing mainly those cases which will favor the operator One must admit that an astute and experienced surgeon could deliberately select a group of patients even with as lethal a disease as cancer of the tongue in whom he could ob tam an almost perfect percentage of cures

The aphorism "The physician sometimes cures, often relieves, and always consoles" finds no greater field of application than in cancer. It is of little interest or benefit to the patient already suffering from cancer to be informed that early or operable or otherwise favorable cases of his disease may be cured in a high percentage of instances. What he wishes to know is whether or not his case may be cured or henefited, and what methods of treatment offer him the most likely relief

In the head and neck clinic at Memorial Hospital, all ambulatory cases of intra oral cancer, both primary and recurrent, are ac cepted for treatment or palhation, and are attended as long as they are able to travel to No patient is refused and from the clinic admission to the clinic because of the advanced stage of the disease In some instances, pa tients apply at the clinic in the early stages of the disease, but are unable because of some unrelated form of physical disability or be cause they live at too great a distance from the clinic to return as often as would be neces sary for adequate treatment Such patients must be refused as being macceptable for ad mission Few are excluded for these reasons however, since most patients with intra oral cancer remain ambulatory almost to the end

TABLE I —MEMORIAL HOSPITAL HEAD AND NECK SERVICE 5 YEAR END RESULTS IN INTRA ORAL CANCER

	All cases of cancer of the tongue 1022-1031 inclusive	All cases of cancer of the lip 1928-1932 inclusive	All cases of cancer of the cheek 1925-1929 inclusive	
Total number of cases	322	251		
Indeterminate group Dead as a result of other causes and without recurrence Lost track of without recurrence Total number of indeterminate results	27 5 32	20 34* 63	5 3 8	
Determinate group Total number minus those of indeterminate group	290	188	gt	
Failures Dead as a result of cancer Lost track of with disea e (probably dead) Living with recurrence Total number of failures in treatment	215 0 1	58 0 58	59 3 1 63	
Successful results (Free from disease after 5 years or more)	74	130	28	
Five year end results (Successful results())Determinate group)	(74/290)	(130/188)	(28/91)	

*(Further follow up is being carried out and the percentage of 5 year cutes [69%] will undoubtedly be raised)

These groups consist of all proved cases of cancer of the tongue lip and cheek, both early and advanced in which patients were admitted during the specified periods. (Only those patients are excluded who made no more than one or two visits and who were then lost track of within the first month.)

The groups of cases presented in this report are made up of all comers and are consecutive and collected rather than scattered and selected For these reasons, this report should represent the actual results which may be obtained in a true cross-section of intra-oral cancer, as it exists today in a large metropolitan center

THE INFLUENCE OF UNCONTROLLABLE FACTORS ON THE APPARENT CURE RATE

If one could exclude every other modifying influence except cancer for a full 5 year period, the percentage of cures should properly be calculated on the total of all cases without any subtractions But as will be shown, there are several factors influencing the apparent percentage of cures which are beyond the control of the surgeon, and which are not affected by the efficacy of his treatment These uncontrollable factors are, first, deaths from other causes unrelated to cancer, second, the in ability to trace certain apparently cured patients for the full 5 year period (these two make up the indeterminate group), and third, failure of the patient to accept the proffered treatment None of these minority groups can be fairly counted either for or against the percentage of cures Each of these factors will be discussed separately

- The indeterminate group consists of patients dead from unrelated causes and those without recurrence who are untraced for the full 5 year period If following chinical disappearance of the cancer and without recurrence, the patient dies within the 5 year period of unrelated causes (heart disease, old age, accident, etc) not incident to, or as a complication of, treatment, the case may not be fairly counted as either a cure or a failure Those lost track of after 1 year without recurrence are also indeterminate, and not fairly counted either for or against the percentage of cures Both of these groups may fairly be subtracted from the total before the net percentage of cures is calculated To count either of these groups as failures to cure is, in my opinion, an ostentatious gesture toward a precision which serves only to obscure the more important facts relating to the efficacy of treatment
- 2 Failure to complete the treatment once begun is frequently due to some defect in the method itself which makes it unacceptable or intolerable to the patient. In such instances, the failure to manage the patient may be the fault of the surgeon or the method of treatment, and as such, should be counted against the percentage of cures. It is reasonable, however, that one should exclude those patients

TABLE II —FACTORS INFLUENCING THE PROG NOSIS IN 322 CASES OF CANCER OF THE TONGUE OBSERVED AT THE MEMORIAL HOS-PITAL 1927-1031

	Total number of cases	Vumber of 5 year cures	Per cent of 5 year cares
Age in) ears Below 40 41 to 50 51 to 60 O er 60	#3 #8 120 131	9 16 26 25	39 33 21 16
Ser Vales Females	276 46	48 16	18 25
Sta e of d sease Operable Boederline Inoperable	90 41 190	50 18 10	\$5 42 5
for to n of growth Anterior third Middle third Posters r third	47 180 95	13 5) 8	27 20 5
Metastases Aone at any time Present on admission Developed after admission	115 113 54	51 6	40 5 22
Histopathology Epidermoid carcinoma Grade I Epidermoid carcinoma Grade II Epidermoid carcinoma Grade III L) mpho-ep theli ma Transitional cell carcinoma Adenocarcinoma Not classified	51 1177 133 2 14 5	33 35 1 0 2	45 25 4 0 14
Associated is philis	69 70	3b 14	17 20

^{*}Biops) pont e but unsatud ctory for exact classificat on

who belong to the nell known class of "clunc shoppers' and nbo go from clinic to clinic, sometimes trying out a treatment or two in each Such individuals characteristically make only one or two visits and then disap pear. There have been excluded from these series for this reason those who were lost track of during the first month after making no more than two or three visits to the clinic

NET 5 YEAR END RESULTS IN CANCER OF THE TONGUE, LIP, AND CHEEK

Using these standards for the determination of groups of cases upon which to calculate statistics, there is presented in Table I the 5 year end results in the main anatomical varieties of intra oral cancer at the Hemonal Hospital Our treatment methods in all of these diseases either have heen or are soon to be published elsewhere (1, 2, 3)

In the choice of treatment methods, we

are not influenced by any attempt to prove the superiority of either radiation or surgery. Our staff is composed entirely of surgeons who select, prescribe, and administer radium, xray, or surgery, either alone or in vanous combinations of the or all three in the individual case, depending on the particular advantages and limitations of each agent. The particular form of treatment for the individual case is selected first on the hasts of its prohable success in obtaining a permanent cure with reasonable comfort. Secondary considerations of importance are the functional and cosmetic result, the length of the convalescent period and the expediency of the proposed plan

As the surgeon becomes more proficient in the use of radiation, either alone or in combination with surgery, the term "importability" becomes less and less synonymous with "in curability," and on the other hand, "radio resistance" does not necessarily predude an

excellent prognosis by surgery

I believe that some uniform method of re porting end results in cancer should be adopted officially by some influential national surgical organization or publication If so recognized, its general adoption would soon follow. It is not sufficient to settle upon a uniform observa tion period, such as the generally accepted a year interval If no uniform method of collection or selection of cases is established the percentage of 5 year cures may be calculated on any one of such arbitrarily chosen portions of the whole group that the statistician may obtain a wide selection of 5 year cure per centages A reference to Table II which is an analysis of the same series of lingual cases cated in Table I, will reveal that by selecting only the "operable" group (a not uncommon procedure in reporting end results), one could claim a 5 year cure rate of 55 per cent in cancer of the tongue, which is more than double the correct figure (26 per cent) for the whole group as shown in Table I By selecting only those without metastases, a 40 per cent cure rate is obtained It would be no more illogical to select only the age group under 40-39 Per cent-or only the females-35 per cent-than to calculate end result percentages on the operable group alone

Even a cursory survey of the present day

medical literature will reveal reports based on cases selected because of "operability," "absence of metastases," "primary lesion less than two centimeters in diameter," etc These highly selective groups are commonly chosen by both the partisan surgeon and the partisan radiologist to emphasize the advantages of his particular method of treatment While he may be perfectly correct in his attitude toward one particular subgroup, a broader view demands a consideration of all cases in any and all stages of the disease Viewed with this broader concept, such subclassifications as "operability" and "presence of metastases" assume an equal significance with "age," "sex," "histological form," etc In other words, all subdivisions or subgroupings become "factors influencing the prognosis" Strictly speaking, no figure so calculated may be interpreted as an "end-result"

The form set down in Table I is submitted as a reasonable method of calculating 5 year end results in cancer It could just as fairly be used to express the end results in measles or appendicates The table begins with the designation of the total number of cases seen during a specified time, and specifies that none were excluded on the basis of the advanced stage of the disease. Next follows an enumeration of the "Indeterminate group," which consists of those dead of other causes without recurrence after 1 year and those lost track of without disease after 1 year. This indeterminate group is subtracted from the total, leaving a net or "determinate group" upon which the end-results may be calculated Next come the "failures in treatment," which include first those dead of cancer, those lost track of with disease (including those wbo did not complete the treatment), and those wbo are living after 5 years with recurrence The difference between the determinate group and the failures is made up by those cases in which patients are living and well after observation for 5 years or more The net end-results are then calculated by the percentage expressed by the equation-living and free of disease after 5 years (/) determinate group If the surgeon wishes to record the cure rates in the various selected subgroups of the total, those data should be set down in a prognosis table,

as is shown in Table II The extent of such an analysis may vary, depending upon the information available and upon the probable significance of the factors influencing the prognosis in the specific anatomic form of cancer under consideration. While such data are of great significance and importance in the study of the clinical behavior and of the treatment methods in cancer, they cannot properly be considered as end-results.

SUMMARY AND CONCLUSIONS

From published statistical data, it is often difficult or impossible to evaluate properly the comparative ments of contemporary treatment methods in cancer because of the wide differences in the make-up of the chnical material upon which the reports of cure rate statistics are calculated. The most misleading forms of reports are those based upon the arbitrary selection of early, "operable" (those operated upon) or otherwise favorable cases, rather than upon all comers in all stages of the disease, both the early and favorable, and those hopelessly advanced Other difficulties are the lack of uniformity in the length of the post-treatment observation interval in various reports, the scattered rather than the consecutive character of the clinical material, and the inclusion in single reports of cases in which patients were treated over too long periods, during which period the treatment methods may have undergone marked changes

There is a need for a uniform tabular method for reporting of end-results which would overcome these inconsistencies. Such a method should largely prevent the arbitrary selection of chincal material and still permit certain corrections for uncontrollable factors. Based upon these principals, a method or form is suggested with a report of the net percentages of 5 year end results in cancer of the tongue, lip, and cheek at Memorial Hospital.

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ILEOCECAL LYMPHADENITIS IN CHILDREN

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T IS now generally recognized that there exists in children and young adolescents. an acute abdominal condition, in which the symptoms are very similar to those of appendicitis, but in which the predominant tindings at operation, and presumably the principal pathological basis, consist only of an inflammatory enlargement of the mesentene and retropentoneal lymph glands drain ing from the ileocecal angle. The condition is common and owing to its resemblance to appendicitis most cases come under the direct observation of surgeons Nearly always the pre-operative diagnosis made is appendicutes Admitting that the clinical picture seen in the two conditions is very similar, my own experience with cases of ileocecal adenitis teaches me that with care and a knowledge of the condition a correct pre-operative diag nosis is possible in at least a reasonable proportion of cases

The general picture of such a case is as follows. The nationt is between the ages of 3 and 18 years. He is seized with abdominal pain which is of varying seventy and can generally be traced to the right lower abdomen During the attack there is evidence of definite toxicity. The attacks subside as a rule, and the child has intervals of weeks or months during which be is apparently perfectly well, but the attacks recur and will continue to recur, until the operation of appendicectomy is performed, after which be will he free from symptoms In English the standard and probably best known descriptions of the condition are those of Fraser in his book The Surgery of Childhood, and of Braithwaite in the British Journal of Surgery of 1025

Fraser writes of it, "There is considerable general disturbance and fever The symp toms rarely last for more than 24 to 48 hours and abate with characteristic suddenness. The pain is local from the start, never referred The tongue remains clean" and he emphasizes a little later, "The attack subsides with characteristic rapidity."

Braithwaite divides the cases for the purposes of description into three age groups. In children from 2 to 6 years old, his description closely agrees with that of Fraser Of the symptoms in children aged from 6 to 10 years he says "They are typined by acute attacks of sudden abdominal pain suggestive of in testinal colic. With the onset of the pain the child cries out, bolds its belly with both hands, draws up its legs, and in 10 minutes is perfectly fit and well Occasionally there is comiting, more rarely there is a passing rise of temperature to 100 degrees F The child though appearing in pain during the attack is perfectly well after it and before it There may be two or three attacks during the day, or there may be intervals of months between the attacks" He classes children aged from 10 to 16 years in a third group, in which he says ileocecal adenitis does not usually occur

It will be noticed that there is a very considerable difference between these two descriptions. I propose to set out a small sense of cases of my own, in most of which reason ably careful bistones and records have been taken. It will be seen that the clinical analysis of them does not bring them into close agree ment with either of the two descriptions quoted.

CLASSIFICATION

I am grouping them for convenience into two main groups, of which Group A com prises those of the more acute type, which closely simulate acute appendicitis, and in which one operates urgently expecting to and a grossly and acutely inflamed appendix. Group B comprises those cases in which the general picture is that of a milder or recurrent type of symptom complex, in which the need to operate does not appear so urgent, and in which the operation is usually performed in the expectation of finding a 'subsiding" or "chronic" appendicutis Necessarily the dif ference between the two groups is one of de gree only, and the distinction is not very clear cut I propose to illustrate each group by setting out a typical case history in full, before proceeding to a full analysis of the general clinical picture

Group A lcute cases This group consists of 7 cases, of which 3 are atypical, in that they are all three members of one family, all attacked within a week of each other, and showed gross edema of the cecal or colonic wall in addition to the glands. These 3 cases must have owed their origin to some common infection of an alimentary nature, and although they must be brought into the group of more acute ileocecal adentis, I regard them as forming a class apart from the others The 4 other cases were patients suffering from acute symptoms in whom at operation no major pathological changes were found in organs other than the glands They closely simulate acute appendicitis, and the patients are generally operated upon under that diagnosis There is often a palpable mass, and the condition is obviously one of a very acute infection. The following case is typical of the class

Case 17 Frank A, aged 14 years, male First symptoms occurred 6 days prior to examination, when he became ill with what his parents described as "influenza" He was feverish for a days, im mediately after which he had severe abdominal pains with fairly severe retching. The pains persisted, being more or less severe in degree, and were said to he definitely worse after taking food. The day before examination he had an attack of shivering, and that evening the pain became localized in the lower right side of the abdomen. His bowels were described as being "inclined to constipation" During the past 2 years he had had repeated attacks of general abdominal pain, these heing less in evi dence during the past 12 months On examination tongue was found to be dry and dirty, the temperature, 102 degrees, pulse, 112, respirations, 20, leucocytosis, 18,000 The abdomen was flat There was tenderness in the right iliac region, overlying a tender mass felt heneath the ahdominal wall The mass was dull to percussion, and lay higher and rather more internally than the usual position of an appendiceal abscess The urine showed a cloud of albumin A diagnosis was made of ileocecal adentitis, and operation was withheld for a period of observa The blood picture on the succeeding 4 days is shown in the table which follows

On the fourth day the mass felt appeared to be more extensive in an upward direction, and his temperature was 103 2 degrees Operation was then performed The appendix was normal in appearance, though with a slight degree of congestion in the

				_				
Date	E0-	Meta mytlo- cytes	Poly mor pho- nu clears	(% band forms)	Eo- sino- phils	Baso- phils	Lym pho- cytes	Mono- cytes
October 20	18000		73	44	05		22 5	3.5
October 21	14200	0.5	\$7.5	35	15		37 5	1
October 22	9000	1 5	64	35	2	05	26	6
October 23	11000		66 3	48	3		24 3	5.3

serosa. It was neither inflamed nor edematous There was a large mass of retropentoneal glands acutely inflamed, the largest and reddest being in the deocecal angle, smaller and less inflamed along the common liac vessels and toward the root of the mesentery becoming smaller as they went centrally. The temperature became normal within 24 hours of the operation and remained so. The albumin disappeared from the urine, and 6 days after the operation the blood picture was.

Leucocytes	r2800
Metamy elocy tes	
Poly morphonuclears	57 5
(% band forms)	13.5
Losmophils	4 5
Basophils	
Lymphocytes	33
Monocytes	5

His health has been uniformly good since the operation, with no attacks of pain

Group B Subacute or recurrent cases These are much the more common type, and 23 of the 30 cases discussed belong to this group The difference is one of degree only, and individual cases of one group may verge on the characteristics of the other, but on the whole the chinical distinction between the two is sufficiently real to justify the division. The following case may be presented as being characteristic.

CASE 21 George P, aged 13 years, male First symptom appeared 2 days before examination. The boy had an attack of pain in the abdomen in the afternoon while going to work. He did not vomit, but felt sick. He had his evening meal, and slept well all that night Pain was still present next morning, and he stayed away from school, but had all his meals There was an interval at mid day free from pams, but they recurred in the afternoon He slept all night, but found the pains still present on waking the following morning. The howels were open normally throughout The pain was always located below and to the right of the navel In the previous 6 months there had been three attacks of pain similar in nature, and lasting from half a day to a day On examination, the tongue was found

to be dirty, the temperature was on 6 degrees pulse 112, respiration rate, 20 The urine showed oo ab normalities Blood examination showed a leucocyte count of 20 800 the differential count being poly morphonuclear leucocytes 44 5 per cent and mature in type cosmophils 65 lymphocytes, 46 mono cytes, 3 per cent The abdomen was tender just below and to the right of the umbilicus not at McBurney's point There was no rigidity but a feeling of slight mass under the pressure of the fin gers A diagnosis of ileocecal adenitis was made, and operation fixed for the following day On the next morning the blood count was repeated, and showed a strikingly different picture. The total leucocyte count was 29 600 with 86 per cent poly morphonuclear cells, well matured, and only 105 per cent lymphocytes The eosinophils had disap peared altogether. At the operation the appendix was found to he large and bulky, with some coo gestion in its appearance but neither edematous our inflamed The retrocecal glands of the sleocecal angle those of the meso appendix and those in the mesentery of the terminal 6 inches of the ileum were enlarged and bard but quite discrete. The tem perature fell to normal immediately following the operation and remained at a normal level through out a normal convalescence. If e has had no recur rence of his intermittent pains since his operation

FREQUENCY

The cases are all from my own practice in a country distinct. The period covered by the series is 13 years, from 1022 to 1935, and during that time there have been 139 cases of young people under the age of 10 operated on for symptoms in the lower right side of the abdomen, suggestive of appendiceal trouble. Of these, 30 or 189 per cent, of the patients have been proved by operation to have been suffering from acute or subacule ileocecal adentits.

Of the 150 patients operated upon, 79 had symptoms undicative of an acute and menacing inflammatory condition, and of these, 72 were found at operation to have an acute and grossly inflamed appendix, while 7, or 9 per cent, were suffering from acute inflammatory swelling of the glands

Patients with milder and recurrent symp toms numbered So, of whom 57 included all appendiceal cases other than the acute ones, comprising "mildly inflamed," "kimks," "fad hesions," interval cases, and so forth. Twentythree of these patients revealed saollen ileo cecal glands as the principal pathological finding.

TABLE I —AGE AND SEX INCIDENCE OF ADENITIS COMPARATIVELY TO APPENDICITIS

	Acut	e append	licitis	Other appendicates			Heocecal adeasts		
Age	Wale	Female	Total	Male	Female	Total	Vi ale	Fe-	Total
1- 3			-	-		-			
4- 5	4	,	6	1	1	7	7	1	3
6-8	3	,	5	_	1	1	3	4	7
9-11	,	6	8	1		3	5	I	6
13-14	14	8	21	4	16	10	5	1	6
15-1g	14	16	20	8	23	31	4	4	-8
	38	36	71	14	43	57	10	11	30

SEX

The sex incidence in these recurrent cases of adenitis is strikingly different from that of "chronic appendicitis" Among the latter in my series, 14 were in males and 43 in females, while of the adenitis cases 13 occurred in boys, and to in girls The figures are too small to mean much, but such as they are they do belp to emphasize the existence of adenitis as a The incidence of right thac separate entity pains in adolescent girls, for which at opera tion it is difficult to assign a reasonable cause, is notorious. If boys alone are taken in this respect, the occurrence of adentis as com pared with that of chronic appendicitis is ap parently equal, 13 to 14, while in girls the similar comparison shows to adenitis to 43 "chronic appendicitis"

CLINICAL CHARACTERISTICS

Ige The youngest child operated upon was 25% years old, the oldest 19 Another grl was 19 when operated on, but she had had repeated attacks since the age of 12 In general the age of these patients at the time at which they come under the observation of the sur geon may be anywhere from 3 to 18 Table I shows the age incidence in successive three year penods.

Private Instory Tifteen of the 3c cases gave a definite history of previous attacks, going back as far as 7 years in 1 case, 4 years to 2, 3 years and 2 years in others all the attacks were described as being similar to the one for which operation was eventually performed. In all of them the health of the chil

dren between the attacks was stated to be absolutely normal. The intervals were from a week up to 12 months in various cases, and the frequency of the attacks varied greatly in any one case. I'wo other cases reported almost constant but remittent pains in the abdomen for 5 or 6 weeks before being seen. The 13 remaining, including 5 of the 7 acute cases, were operated upon during or following their first attack.

Duration of attacks The acute group of cases showed no sign of remission of their symptoms up to the time of operation. The longest time between the onset of symptoms and the performance of the operation was ridays, the shortest 2 days. In the recurrent cases, the duration of the attacks was in some instances determined by actual observation, but for the most part had to be ascertained from the child's mother. There is a wide variation in the duration, from 10 minutes as in Case 15, to 2 days in many cases. As a rule the duration of the attacks may be taken as being 1 or 2 days, and gradual subsidence was the rule.

Accompanying bowel disorders Of the 26 cases in which the condition of the bowels has been recorded, 22 are said to have been regular and normal up to and during the attack. Two were said to be inclined to constipation generally One had an attack of diarrhea on the fifth day after the onset of pain, but normal evacuations until then And one passed a "green slimy motion" on the morning of onset

Vomiting The occurrence of vomiting is noted in 8 cases only, in 3 being severe with constant retching, and in the 5 others a single vomit only. In 17 cases it did not occur, and in 5 the record fails to report on it.

Tozenta In all those 4 acute cases which followed the typical adentis course and did not show gross bowel wall changes, general tovenic symptoms precedent to the onset of pain were very marked In one case it was described as "influenza," in another tonsillitis, in a third "drowsy and feverish" while the fourth spoke of "feeling sick," for some time before he felt any pain The child who considered he had tonsillitis, said he had had it for 5 days before pain

Of the 23 recurrent cases, 8 gave a definite history of precedent symptoms of general tovemia, varying in description from dizzines to headache and dehrium. Four showed evidences of general toxicity during the attack, 1 being jaundiced, and 1 having alhuminuria. Two had only very mild evidence of toxemia, and in 9 it was either absent, or not recorded

Location of pain The statement that pain in adenitis is "always local, never referred" is not borne out in any sense in my experience In 11 of these patients there was a later localization of the pain following earlier generalized pains which were impartially general, upper abdominal, or left sided in position Four reported general colic-like pains without any later localization In 7 the pain commenced in the right lower abdominal quadrant, and remained there throughout. In 2 the pain remained referred to the upper abdomen all through the attack, and in 2 it remained localized around the umbilicus. In 4 cases the exact localization of the pain was not recorded

Location of tenderness In this respect unfortunately my earlier notes are not as exact as they should have been Too many of them report the tenderness roughly as "right lower abdomen" or "appendiceal region" Eleven cases are noted as having the point of maximum tenderness in the right iliac region, and two as "at McBurney's point," which latter term, in the loose sense in which it is used is probably about equal to "right iliac" in definiteness In 2 cases the maximum point of tenderness was not specified Thirteen, however, of the later cases have definite notes recorded, and of these, 3 are marked as "internal to McBurney's point," I definitely at McBurney's point, 2 higher than this point, 5 "just helow and to right of the umbilicus," and 2 as "just below the umbilicus and both to right and left of it " In 1 case (Case 15), one of the earlier attacks which I personally observed gave a point of maximum tenderness just helow and to the left of the umbilicus, while on the next attack, it was just below and to the right of it Further experience and more careful examination with regard to this in particular, make me feel sure that in nearly all of the 12 first cases, more careful recording

would have demonstrated tenderness at a definite point, differing from that at which the tenderness of appendicitis is usually felt, and that this is a point of decided importance in making a diagnosis

Rigidity In 5 cases ngdity is reported in the right flac region, and 3 are marked down as doubtful in regard to rigidity. The 22 others had definitely no rigidity of the muscles over the inflamed glands. All those in which rigidity was definitely present were of the acute type, and the absence of rigidity is a point in favor of the diagnosis of adentits.

Palpable mass. The gland masses were palpable through the abdominal wall in only acases, all of the acute type. A mass is not necessarily to be looked for in adentits, and this is readily understandable when the glands are seen at the operation. It requires a considerable swelling of them, and some considerable swelling of them, and some considerable swelling of them, and some considerable swelling of them, and some considerable without an anesthetic. When it is felt, its position is as a rule higher in the abdomen than is that usually presented by an inflamed mass of appendix and omentum. This point assisted me in arriving at a correct diagnosis in one

Tongue In 12 of these cases the tongue was described as 'drity In the others this point was not noticeable In general the tongue is that of a mild condition

Temperature and pulse The same may be said of the temperature In 20 of my cases it was below 100 degrees throughout In only 4 did it exceed 102 degrees, and only twice did it pass 103 degrees. Evidence of marked intoxication is not shown by the tongue, or by the temperature except in the more acute type of case. The pulse corresponds in nature Only in 11 cases did the rate rise above 100, and in none of these above 120

Leucosiosis Examinations of the white blood cells give the same picture of a fairly mild general infection. Counts were made in 40 fmy cases, and the results were very largely variable. Thus i case showed 20,000 leucocy teson one day, and 23,0600 per cubic millimeter one day, and 30,600 the next. In general one eypects a count of somewhere

about 20,000, with approximately 70 per cent of neutrophils and these of mature type. In I case (Case 17), while the leucocyte and the total neutrophil counts remained steady, there was a persistent increase in the percentage of immature and "band" forms of polymor phonuclears This has not been common in the less acute type of the disease Eosinophil counts of o, 10, and 17 per cent have been noticed, but on one of these being repeated next day, all cosmophils had vanished from the fields counted The leucocyte count in these cases would seem to be of no value in diagnosis, other than in supplying evidence of a certain degree of toxemia without offering any indication as to the specific cause

OPERATIVE FINDINGS

Appendix The appendix is never found to show pathological changes comparable to those in the glands that drain from it The reports on the appendices removed in this series vary from "normal" without comment, to "mildly inflamed" or some other similar term It is noticeable that the term "long and bulky" occurs rather often in the de scriptions, but as these cases are all children, in whom the appendix is usually rather larger relatively than it is in adults, the significance of the description is somewhat doubtful Red dening of the serosa to a mild degree is seen in about half the cases The mucosa is most often normal to the naked eye The contents are mainly semifluid feces, in a few cases stercoliths Microscopic examination of the appendix wall, which has been carried out in only a few of the cases, discloses only a normal, or slightly congested organ In an endeavor to support a supposition that the reddening of the appendix seen, represents only a residual inflammatory condition, and that the organ as seen is in a subsiding condition after having been inflamed, and having infected the glands, I divided the cases into those operated on less than 3 days from the onset of symptoms and those of longer duration I found no support for the theory Cases of 10, 11, and even 30 days' duration showed the slight reddening in just the same proportion of their total num ber, as did those seen on the first or second day of the attack. In I case in which the

diagnosis had been made and operation had been deferred deliberately until 9 days after the subsidence of the symptoms, the reddening of the lower ileum, cecum, and appendix was as definite as in any I have seen In no case was there anything remotely approaching an acute inflammation of the appendix

Lower ileum This was in a few cases described as slightly reddened, along with the appendix In about half the cases its condition was not specially mentioned, in the rest it is stated to be normal in appearance

Cecum and colon In 2 acute cases recorded above as of a special type of acute case, and in which the patients were operated on, there was swelling, presumably inflammatory in the cecum and colon No change in the appearance of these organs is otherwise noted

Peritoneum Occasionally a small amount of free fluid was noticed in the peritoneal cavity It was never great, and may on other occasions have escaped my notice. The pentoneum itself seemed to take very little part in the inflammatory process occurring in the glands underlying it Only in the 2 acute cases mentioned, with swelling in the bowel wall, was edema of the peritoneum or of the meso appendix noticed This is in rather striking contrast to the edema of the mesoappendix seen so frequently in cases of acute The peritoneum is usually appendicitis stretched loosely over the glands, and is not even conspicuously reddened, which fact has probably a bearing on the fact that absence of rigidity of the abdominal wall is such a constant feature of adenitis cases Apart from the slight reddening sometimes seen in the serous coat of the appendix and lower ileum, the peritoneum appears to take no part in the pathological picture

Glands In these lay practically the whole of the pathological changes grossly visible The situation of the glands found to be affected in this series was as follows

Heocecal angle and meso appendix

Inner border of cecum Mong the right common iliac vessels In the root of the mesentery In the mesentery of the lower ileum

In the angle between the two common iliac arteries In every case, the glands were large enough

to be immediately felt by the exploring finger

In general when discrete they were about the size of a French bean. In color they were a light tone of liver color, or a reddish pink Lucept in those cases in which they had fused into a conglomerate mass, they were readily movable under their peritoneal covering, and on this covering being incised they readily On section of their capsule the extruded gland substance, pinkish in color bulged out Microscopic section of several of them revealed nothing more than a lymphoid concentration of round cells, and cultures of the scrapings taken from two of them in situ and cuftured on agar, failed to produce any growtb

CLINICAL COURSE OF THE DISEASE

Since the positive diagnosis of adentits is confirmed only by operation, all reported cases are shown as terminating by operation It is possible that many other patients suffering from such swelling of the glands have less severe or less frequent attacks, and not being operated upon, never get into the records of adenitis cases I have among my own records a number of cases of children in whom I have diagnosed adenitis recently and left for further observation But, the diagnosis not having been proved, they cannot come under dis-Country practice, however, cussion here affords excellent opportunities for prolonged observation, and I have been able to watch these patients personally for years both before and after their operations. The course of events is apparently this A child suffers infection of the glands, evidenced by an attack of pain In many instances this does not lead the mother to seek medical advice, and it subsides, but having once become infected, the attacks of acute swelling have a definite tendency to recur The child has one attack after another at varying intervals, until the mother takes it for advice. If the condition looks sufficiently like appendicitis the child is operated upon If as often happens the picture is not completely like that of appendicitis, if the tenderness has passed off, or is placed round the umbilicus, or even to the left of it, operation is deferred. The attacks are still repeated, and finally the child comes to be operated on, and the appendix is removed

From that time onward the attacks of pain cease, and the child remains in good health I have watched one such child for 7 years, others for 3 or 4 or less And I am nimly of opinion that until the appendix is removed, the attacks will inevitably recur. I have not yet seen a child in whom the attacks of pain recurred once the appendix was removed, and I have been able to follow them all closely for years after opperation.

What would happen to the glands if the appendix were not removed it is difficult to say The nature of the disease, and the conditions for making the diagnosis forbid discussion of the point. Whether the glands would become calcuted or whether they would gradually lose their susceptibility to the attacks of inflammation with advancing years is problematical. In a patient whom I operated on at the age of 19 years, after 7 years' history of symptoms, the glands were—"some hard and calcined, some caseated, some acutely inflamed and edematous" Other pa tients operated on after 4 years' known his tory of repeated attacks have shown glands no different from those seen in first attacks

THE RELATIONSHIP OF THE OBSERVED GLAND CHANGES TO THE SAMPTOMS

The relationship of the gland changes to the symptoms is a matter of some little difficulty to satisfy oneself upon. In one group of cases the patient shows a certain group of symp toms, and when operated upon an evidently diseased appendix is removed—here the relation between cause and effect seems clear In another group of cases very similar symp toms are exhibited, but operation reveals a cluster of acutely inflamed glands and again the relation between cause and effect seems clear But there is yet another group of cases with a very similar symptom complex and operation reveals a normal appendix and normal glands, here the assigning of a cause to the effect is not easy T A Smith of New York takes the view that symptoms in this type of case are due to a condition of lymphoid hyperplasia of the appendix, and in the comparatively few cases in which he found glands enlarged he considered them of quite minor importance. My experience leads me to be-

heve that very careful history taking, and a very close examination of the point of maximum tenderness, will enable a differentiation to be made between those cases in which the appendix is the direct cause of the symptoms and those in which the principal role is played by the glands And, further, that the inflamed glands are the direct exciting cause of the symptoms The mechanism of the production of these symptoms is probably this. The toxic symptoms accompanying or preceding the pains, indicate the invasion of the body by the infecting organism, by whatever portal it enters. The largely reflex character of the pains and their colic like nature in the early stages, suggests a reflex bowel spasm due to stimulation of the sympathetics by the de velopment of inflammatory changes probably in the glands or possibly in the ileocecal region of the bowel \nd the later localized pain and tenderness are probably due to distention of the capsules of the glands and the immediately surrounding connective tissue Inflammation of the peritoneum does not appear to play any important part

PATHOLOGY

By very far the greater part of the discus sion on the pathogenesis of inflammatory swellings of the retroperatoneal glands, bas hitherto centered round the part which is played in it by the Bacillus tuberculosis Other interesting questions, such as the portal of entry of the infection, and its nature if not tuberculous, have been very much less de bated, though they are receiving more at tention of recent years than they did in the Ten or 20 years ago, the tuberculous basis of the gland swelling was accepted un questioned Braithwaite, in his exhaustive article on the subject, quotes 19 authors, of whom 13 used the word tuberculous in the titles of their papers, and the remainder imply a tuberculous etiology in the text, as does Braithwaite himself Fraser in The Surgery of Childhood describes them as tuberculous glands affected by periodical bacterial in vasion from the bowel The constant tend ency of the acute attacks to recur once the glands have been infected, certainly inclines one sympathetically toward this theory The main objection that can be brought against it, is the difficulty constantly found in proving any tuberculous infection in the glands Microscopical examination of them by many workers has repeatedly failed to demonstrate in them any tubercle bacilli, or any tuberculous structure Strombeck analyzed very thoroughly 348 cases of mesenteric adentis, of which he considered 308 to be tuberculous, and 40 to be non-tuberculous His tests in cluded many guinea pig inoculations, but his main reliance was in the appearance of calcification appearing in the glands in later life He considers that calcification should be detectable by x-ray, in 18 months to 2 years after the infection I have been able to examine by x-ray, 8 of my patients for this purpose I have not examined any in whom the operation was less than a year previous, since, though the history may go back much further than that time, there was no calcification apparent at the time of operation, and that time is therefore taken as the starting point The results of these examinations are set out in Table II

The completely negative nature of the results has, I confess, surprised me The most surprising point about it is the result in Case 7, in which at operation, 7 years after the onset of symptoms, well marked sharp edged calcified glands were found The shadow in the roentgenogram is very vague and indefinite, and it is quite evident that the hard calcification of the glands no longer exists Strombeck, in his paper, discusses the possibility of resorption of calcium deposits in abdominal glands and holds that it does occur to some extent It has unquestionably occurred al most completely in this case, but the bearing of this phenomenon on the value of this serial examination is not great, for 2 reasons. One is that calcium resorption to any great extent is certainly not usual, and the other is that the varying periods after operation at which the examinations were made and the varying penods after onset of symptoms at which the operations were done should eliminate the possibility that the absence of calcification both at operation and on v-ray, could be due to this cause. The suggestion offered by a study of this series of cases is that there is no

TABLE II —ROENTGENOGRAPHIC RE-E\AMINATION OF CASES

Case	Time since first symptoms	Time since operation	Result
13	16 mos	16 mos	No calcification
6	g yrs	9313	No calcification
14	3 yrs 9 mos	1313 g mos	No calcification
16	\$ > 15	4315	No calcification
-	6 yrs	I) r g mos.	No calcification
7	15 315	8 3 75	l aint vague shadow ? calcitication
8	4 í yrs	4 yrs	No calcification
11	4318	4318	No calcification

proof in them of a tuberculous infection as a basis of the condition. Further than that it

is probably not wise to go

The portal of entry of the infection would seem to be the lower ileum and more particularly the appendix The distribution of the glands found affected, the occasional finding of reddening of the appendix and lower ileum at operation, and most particularly the complete relief of symptoms achieved by removal of the appendix, make it seem almost selfevident But certain facts need explaining before it is conclusively proved. The slight degree of involvement of the glands of the meso appendix, in comparison with those in the ileocecal angle and in other places is one of these Another is the different behavior of the glands in these cases from that in gross acute inflammation of the appendix, in which they are comparatively slightly affected Influenced by these points, Pribram considers that abdominal adenitis is due to an infection of the body by an organism having a special selective attraction for lymphoid tissue, and regards the tonsils as the main originating focus He states that he has seen cases in which abdominal pains that have persisted after appendicectomy, have ceased entirely following removal of the tonsils Nothing I bave observed in these adenitis cases inclines me to accept his view, while on the other hand, in one of my cases, the tonsils had been removed a month before the onset of the attack which finally led to operation and cure by appendicectomy B Schnitzler explains the pecuhar behavior of the glands in these cases on the basis of a delayed infection of

them, the appendix or lower ileum having sus tained an infection which has disappeared and left no trace by the time the operation has been performed \s stated, I fried to find some support for this theory by grouping my cases with operation in terms of the duration of symptoms before operation but could find none It remains the most likely possibility that the condition is caused by an infection with an organism in the ileocecal area, which has a slight local effect, but a marked second ary effect on the glands in the draining area But the actual pathology and bacteriology of the condition still remain to be worked out almost in their entirety

SUMMARY

I have presented in this paper a small series of 30 consecutive cases of acute ilcocecal adenitis, and have endeavored to show by an analysis of their clinical features that a differential diagnosis between this condition and appendicitis is possible, at least in a reasonable proportion of cases I have drawn from them the conclusion that if operation is not done the attacks of pain will continue to occur intermittently, but that the removal of the appendix will bring about complete and permanent cure In a short discussion of the pathology of the condition I have not been able to do more than show that tuberculosis as a basis for it must still be regarded as un proved, and to indicate that very little definite knowledge about the actual etiology custs

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CLINICAL SURGERY

FROM THE TUMOR CLINIC, MASSACHUSETTS GENERAL HOSPITAL

THE GREENOUGH TECHNIQUE OF RADICAL MASTECTOMY

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HE modern treatment of carcinoma of the breast by radical removal of the breast, both pectoral muscles, and the avillary contents was first carried out and described by Halsted and Willy Meyer J C Warren, of Boston, promptly adopted the new operation, and published a modification based primarily on Meyer's technique of operation The late Dr Robert B Greenough was early associated with Warren in this field of interest, and one of his first publications (1) dealt with an end result study on cases of carcinoma of the breast William L Rodman was also responsive to the teachings of Halsted, Meyer, and Warren, and described a modification of the operative technique employing a transverse axillary incision Greenough was prompt to recognize the ments of the Rodman operation and adopted it in his practice He modified Rodman's technique by removing a wider segment of skin between the breast and the axillary transverse incision, and also changed the order in which the various steps of the operation are carried out. The resulting incision about the breast was thus roughly in the shape of an arrow head (2)

The night before operation the field of operation is shaved and scrubhed with soap and water followed by the application of alcohol, and is covered with a sterile dressing. The field of preparation should extend from the line of the paw to the umbilicus, and from the opposite anterior azillary line across the front of the chest to the midline of the back. The azillar is shaved and painted with a 25 per cent solution of aluminum chloride to inhibit perspiration, and the skin preparation is carried down the arm to the elbow When the patient is under the anesthetic, the operative field is painted with half strength (3½ per cent) tincture of jodine, and the arm is

wrapped in a sterile towel and placed on an arm.
This paper was prepared as a tribute to the memory of the late
Robert B Greenough with whom the authors were associated as
assistants and jumor colleagues over an aggregate period of 18

board abducted at a right angle from the body Use of a fairly narrow arm board permits the assistant to stand in the angle between its upper border and the upper end of the table, with draping arranged to exclude the patient's head and the anesthetist from the operative field

The transverse axillary incision begins at the lower border of the clavicle near its mid point, that is, immediately overlying the apex of the axilla (Fig 1, inset) Medially the clavicle and first nb run roughly parallel to each other, but as the palpating finger passes laterally the depression can be felt at the lateral border of the subclavius muscle, where the rib begins to turn backward and upward This depression forms an accurate landmark for the upper end of the incision From this point the incision courses downward and outward, crossing the free border of the pectoralis major well on the avillary side of the upward prolongation of the breast but below the axillary hair area Incisions that cross through the axillary hair area are likely to be a nuisance to the patient later. The incision continues to the posterior avillary fold, that is, to the latissimus border, at about the level of the lower end of the scapula Greenough taught that this incision need not he straight. The first part could run straight downward, then curve outward across the axilla, and again turn downward in the lower part of the axilla. Thus, the upper part of the scar is covered by the shoulder straps of a woman's garments

This incision is carried only through the skin, and then it is deepened by beveling it outward toward the insertion of the pectorals major and toward the free horder of the latissimus (Fig. 1). The pectoralis major muscle is exposed only near its insertion, for there may he nodes on the an terior surface of the muscle. Near the upper end of the incision, the beveling carries the flap upward to expose the clavicle laterally.

When this axillary flap of skin has been raised completely, the pectoralis major muscle is ex-

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Fig r The transverse axillary incision 1 B (inset) starts near the mid point of the clavicle and runs downward and outward across the axilla to the posterior axillary fold The incision is beveled outward to expose the laussimus and pectoralis major muscles near the humeral insertions

posed from its insertion along a line running roughly to the mid point of the clavicle, and in this region the fibers of the muscle are parallel to the line so exposed A little above, the cephalic vem can be seen, and it should be spared. The insertion of the pectoralis major is divided close to the humerus and the muscle is split along its fibers up to the clavicle, leaving only a few of the lateral tibers originating from the clavicle (Fig. 2)

At this point in the operation it is necessary to make a further skin incision to give free access to the apex of the axilla This incision is the upper part of the upper and medial of the two incisions destined to encircle the breast in the

shape of an arrow head (Fig 2, inset, DC) It

Fig 2 The pectoralis major is divided close to its in sertion and the fibers are split to the clavicle. The origin of the muscle from the clavicle is divided. The skin in cision DC (inset) gives greater freedom of access to the apex of the axilla

starts from a point on the transverse axillary in cision near the free border of the pectoralis major muscle, follows this downward and medially toward the breast, and then swings medially toward the sternum around the upper and medial aspect of the breast, to include all the skin overlying the breast tissue. Its exact location varies somewhat with the position of the tumor in the breast Only the upper part of the incision is necessary at this stage of the operation. The resulting skin tlap is beveled back toward the clavicle and ster num, to permit separation of the pectoralis major from the medial half of the clavicle and the upper part of the sternum

With the pectoralis major muscle drawn down ward, a little sharp dissection exposes the upper intercostal muscles and the subclavius muscle, at the border of the tendon of which the axillary vein is encountered as it enters the canal behind the muscle and between the clavicle and the first rib Exposure of the vein for the first time at this point permits early appraisal of the extent of axillary involvement and provides at least the possibility of retreat if an incorrect estimate of

operability has been made

By means of sharp dissection, the fat and areolar tissue are then freed from the surface of the vein, working distally to the medial border of the pectoralis minor muscle. This muscle is divided near its insertion and retracted downward. As the dissection is carried distally along the vein, the individual branches of the vein are clamped before division and tied at once to avoid undue traction on the vein (Fig.) When the lower



Fig. 3 The pectoralis minor is divided near its insertion and the axillary contents stripped away from the axillary sein from the apex outward Note the free border of the subclavius muscle marking the apex of the axilla Note also the cephane vera lying on the border of the deltoid muscle and its point of junction with the axillary vein. In the outer axilla the sub-capular vessels and thoracodorsal nerve can ordinarily be preserved.

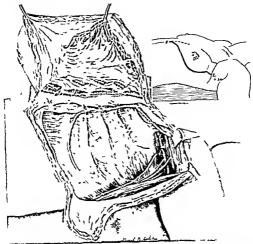


Fig. 4. The measion EF (inset) gives access to the lower axilla and its contents are carned medially with the breast. The long thorace nerve is encountered lying on the scratus digitations and is not disturbed. The origins of the pectoralis minor and major muscles are divided close to the chest wall. Note removal of the upper part of the rectus sheath.



Fig 5 The specimen is finally freed from the chest wall by the mission FG (finest). Closure is begun at the three corners of the wound. If necessary a defect may be left on the chest wall to be closed by immediate or deferred skin graft.

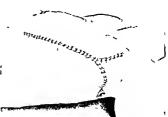


Fig 6 Closure completed Drainage may be carried out through the outer angle or through a stab wound hote the relation of the scar to the axillary har area Note also that the infractavitular scar will be concealed by the shoulder straps of the clothing.



Fig. 7 Postoperative appearance of the patient. Note freedom of the function of the arm and the position of the scar.

border of the axilla is reached the dissection is carned downward along the free border of the la tissimus muscle, moving medially over the teres major and the subscapular muscle to the chest wall It is usually possible to spare the thora codorsal nerve to the latissimus and the subscapular vessels accompanying it, but other wise all the loose areolar tissue in this region is dissected free and retracted medially with the breast At the chest wall, the upper digitations of the serratus anterior muscle are encountered, and lying on them the long thoracic nerve A minimum of areolar tissue is left overlying the ners e which is not lifted from its bed 1 but other wise the serratus digitations are dissected clean of their overlying fascia

At this point it is necessary to make another skin incision (Fig. 4 mset \dot{E} \dot{F}). The incision begins at the transverse axillary incision about 2 inches lower than the upper one previously made, and sweeps downward and then inward around the lateral and inferior borders of the breast. This incision like the others is beveled back away from the breast to reach the chest wall well beyond the breast itself. Access is thus secured to the lowest part of the axilla and lowest serratus digitations which are dissected clean

The breast and muscles are now hired and re tracted medially, and the muscles are separated from their origins on the chest wall (Fig 4)

"If the nerve is lifted from its bed the ind vidual branches to the serratus digitations are of course destroyed When the structures are lifted in this way it is possible to see and scure vessels before dividing them. This maneuver is particularly desirable in dealing with the perforating branches of the internal mammary vessels. At the lower and medial end, more or less of the upper rectus fasca as removed, depending on the location and extent of the primary growth. Dissection be neath the breast in this fashion is carried medially to the mid sternal region or beyond, depending on the location of the primary growth.

When the hemostasis has been secured on the chest wall the breast is allowed to fall back into its normal position, and the skin incision is completed along the medial border of the breat (Fig 5, inset, F-G). This finally frees the entire

specimen After complete hemostasis, closure is usually effected without great difficulty, due to the wide beveling of the wound and undermining of the skin The transverse axillary incision is closed from either end The redundancy of the lateral skin flap, of a length corresponding to the base of the removed arrow head shaped area of skn on the specimen, is drawn downward and sutured to the upper axillary parts of the two incisions which swept about the breast. Thus these two are brought together and sutured to each other, leaving a linear wound extending to the epigastrium (Fig 6) Occasionally the tension is too great and a defect must be left to be closed later by granulation or by skin graft

GENERAL CONSIDERATIONS

There does not seem to be any very efficient method of applying skin towels to an operative wound of this kind The best alternative seems to be to make incisions only as they are needed in the course of the operation, and to keep all parts of the wound constantly covered with hot wet packs except for the area actually in process of dissection This procedure minimizes as much as possible the exposure to infection as well as blood loss, cooling, and drying

We deplore the use of tenacula and double hooks in retraction on the skin flaps, although it is permissible on the muscles and skin to be removed Excessive use of toothed forceps on the skin edges is also to be condemned Smooth retractors, or the hand of the assistant protected with gauze, should be all that is necessary Dissection should be sharp, either with scissors or knite, and hemostasis should be accurate and exact. In recent years we have frequently used electrocoagulation instead of ligatures on all vessels except the branches of the axillary and subscapular vessels This method does not appear to give rise to any more serum or reaction in the wound than the ligature Ligatures should be of fine catgut or salk

Blood loss in this operation varies within rather wide limits, depending upon the skill of the surgeon, and it is greater in obese patients, in patients with large breasts, and in those with hypertension In a number of routine determinations, the blood loss ranged from 200 to 800 cubic centimeters Clamping of vessels before division, scrupulous care in hemostasis, and the use of hot gauze packs on the exposed areas, all conduce to

minimize the amount of blood loss

Drainage was a moot question among the early writers on the subject, and will continue to be A considerable number of these wounds can be closed safely without drainage Serum will collect in an appreciable number of these in an amount sufficient to require aspiration, or even repeated aspirations A Penrose drain brought out at the lower end of the transverse axillary incision, or through a stab wound in the lower skin flap, usually suffices to evacuate the serum that collects immediately after operation, and can be safely removed at the time of the first dressing A second wick in the epigastric region is sometimes needed in obese patients

Skin sutures are best interrupted, and we find fine silk satisfactory Great care should be taken with coaptation of the skin edges, especially in the infraclavicular portion of the wound Where tension is great, across the middle part of the defect, a few pulley stitches may be necessary. It excessive tension is present, it is better to leave a small area to granulate than to risk devitalization and necrosis of the wound edges by use cf heavier suture material in an attempt to secure closure We have not used primary skin grand in these cases, but have resorted to secondarthick Thiersch grafts or small deep grafts when the defects were extensive

At the completion of the operation, pressure should be applied to evacuate all air, serum, are blood from the wound The dressing should be applied to press the flaps firmly against the care t wall and to obliterate all dead space. The arm should be immobilized, preferably by the u e cra second binder, holding the arm close to the ace with the forearm free or across the body There is no question that immobilization of the arm acc only minimizes the flow of lymph but al., crevents the recreation of axillary dead space e-

neath the flaps

The first dressing should be deferred ar at least 2 days, and preferably for 4 or 5 da _ 1 this dressing the drain may be re-cved to least partial immobilization of the arm arei's be continued for from 6 to 9 days State be removed in a week from parts of the and the where there is no tension, the remarker --removed in to days Motions of the and the stored by active use and exercise, and well a free in about 3 weeks Some sort ci zelia. dressing should be retained for about 124 As a general rule, the patients are a le 1 7 their usual occupations within a mer's a fee time of the operation

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DOUBLE PULLEY TRACTION IN THE TREATMENT OF HUMERAL SHAFT FRACTURES

LESTER BLUM, MD, New York, New York

T IS evident that the current fashion in the care of fractures is distinctly mechanical The literature is replete with descriptions of ingenious devices designed to facilitate the reposition and maintenance of bony frag ments To the critical observer, it would appear that the wand of Caduceus is being forsaken for

the tool chest of Vulcan

The use of mechanical appliances for the treat ment of fractures is no novelty. A perusal of the Edwin Smith surgical papyrus, which was in scribed before 1500 BC, makes this quite evi To account for the present zeal m the exploitation of intricate apparatus, there are two apparent reasons. The first is the wide spread custom of evaluating the major aspects of any particular case in terms of the x ray plate This attitude places a disproportionate premium on the attainment of roentgenologically accurate reduction Second it is now stylish to force ambulation on nearly all fracture patients as early as possible. It is assumed that a shorter hospitalization is attended in practically all cases, by a more rapid convalescence, minimal disability, and a more complete return to normal This association far from being axiomatic, is

neither clinically proved nor logically tenable The indiscriminate employment of pins, screws, wires bolts nails and their kindred devices has thus brought the problem of man and the machine to traumatic surgery Are we in danger of losing sight of the individuality of the patient and of the individuality of his particular fracture in a maze

of gadgets?

It is therefore with a sense of added respon sibility that I wish to present an apparatus first used 4 years ago for the treatment of fractures of the shaft of the humerus 1 My intention is to outline its application advantages, and limita tions in as objective a manner as is possible in clinical exposition

The appearance of double pulley traction is shown in Figure 1. It is a multiple pulley system

From the Surgical Service of the Beekman Street Ho rital New York, New York

1Blum L The use of double-pulley traction in the treatment

of fractures of the shaft of the humerus J Am M Ass 1933 101 1953

directly patterned after Russell traction. It is not so eponymically designated because it functions differently, furthermore, multiple pulley systems were used for fractures 1500 years before Russell, and his name should, therefore not be used as a generic connotation for all pulley systems finally, in deference to Dr Russell we do not wish to add to the confusingly numerous modifications bearing his name

DESIGN AND APPLICATION

As can be seen, the patient lies supine with the bed tilted by shock blocks to about to degrees off the horizontal to afford countertraction. A Balkan set up is used to support the pulley frame This latter can be patterned to a size and shape appropriate to the type of bed and size of the room

The injured arm is abducted to the desired degree so that the olecranon lies clear of the A padded sling is apposed to the antecubital region with the elbow joint in exten

sion of 110 to 130 degrees

The continuous rope leads down from the antecubital sling to the single pulley on the horizontal arm of the frame. From there, it runs up to and around one wheel of the double pulley to the wheel on the hand cage. The rope then leads back to and around the other wheel of the double pulley to suspend the weight

The frame is simply constructed of wood Holes are bored at intervals in the vertical and horizontal limbs for the placement of the pulleys The hand cage is of the ordinary type used for skin traction of the upper extremity, except that it is surmounted by a pulley wheel. It is affixed hy moleskin strips applied to the volar and dorsal aspects of the forearm. This leaves the arm fully exposed as it lies on the mattress

With some practice the injured extremity can be transferred from emergency traction to the completed arrangement of Figure 1, within o

This apparatus functions on the plan of a parallelogram of forces In Figure 2 the direct and resultant lines of force are superimposed on a duplicate sketch of Figure 1 There are two

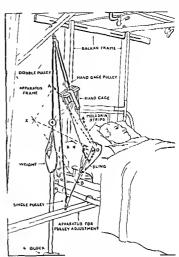
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Fig 1 Double pulley traction

directions of pull One (OB) is downward, running from the elbow in the direction of the single pulley. Its force is transmitted through the cubital cuff and it is equal to the suspended weight.

The other pull (O.1) is upward, from the elbow toward the double pulley and its force is twice the suspended wight, since this is a double pulley system. The resultant force (O.1) hes one-third of the intervening angle nearer the greater force (O.1). This resultant represents the diagonal of the dynamic parallelogram and it is equal to a little more than twice the suspended weight. It constitutes a true aus traction force. Thus, if the weight used were 4 pounds, force O.1 would be 8 pounds, force O.8 would equal 4 pounds, and the resultant O.Y would approximate 9 pounds. Because of the effect of gravity on the forearm and hand cage, the direction of O.1 is taken as 5 degrees lower than the theoretical double force.



I ig 2 The mechanics of double pulley traction O.4, True double force, OB, single force O\(\cdot\), resultant force, O i apparent double force, O\(\chi\), aus of fragments When 1OB is a right angle, \(\chi\)OB is twice \(\chi\)O i \(\chi\)OD (approx 26\(\chi\)) compensates for

(1), sinking of patient in bed. (2), sagging and friction of the apparatus, (3) pressure of mattress at the fracture site

O1' which runs from the elbow directly to the double pulley

In the typical case, the moleskin strips for the hand cage are applied to the forearm before the extremity is removed from emergency traction. This will allow them to become firmly adherent to the skin before any tension is placed on them thus avoiding the necessity of substitution during the course of treatment. The frame is set at the desired degree of abdiction, the rope strung through the pulleys, and the shing put in place.

The initial weight is determined by the muscular development of the individual and by the extent of soft tissue injury. In general, it is advisable not to exceed 5 pounds for men, 4 pounds for women, and 3 pounds for children and adolescents. It has, in fact, been our everience that these are initial, maximal figures and must, as a rule, be reduced sometime during the

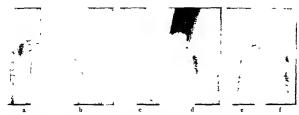


Fig. 3 Case t a Anteropo terior view at 5 hours Overndung is evident. b Lateral view at 5 hours Anterior angulation of 40 degrees. c Anteroposterior view Angles

tirst week of treatment because of the danger of

If the plane of the mattress on which the arm rests $(O\bar{\Lambda}')$ is considered to be 185 degrees then the double pulley should as a preliminary posi tion be so placed that the forearm is su-pended (double force O 1) about 50 degrees above the mattress or at 2,0 degrees The single pulley, below, should be adjusted so that the rope leading from the sling (single force OB) lies about 40 degrees below the mattress plane or at 140 degrees. With this initial arrangement, the resultant (O1) will be directed about 20 degrees above the mattress (180 degrees) plane (OV). which is also the plane of the proximal frag ment In practice, this 20 degrees upward cor rection has been found to be necessary since the sinking of the patient in the bed, the sagging and friction in the apparatus and the upward pressure of the mattress at the fracture site all tend so to alter the direction of axis traction

Anteroposterior and lateral roentgenograms are taken within 12 hours and check up films, thereafter, at indicated internals. If overriding is present the problem is one of obtaining sufficient traction over a sufficiently long period of time since this type of angulation is caused by insufficient pull. It has nothing to do with the angles involved. However, if full length has been obtained and an anterior angulation is present then an adjustment of the angles to alter the direction of the resultant is necessary.

This is done by first measuring the actual deviation on the reentgenogram with a protractor. The reading in degrees represents the divergence between the working resultant and the desirable one. This discrepancy is then eradicated by

adjusted. \ ray nim taken at 24 hours. Angulation of 2 degrees. d Lateral view e Anteroposterior view at 48 hours. f Lateral view

appropriate movement of one or both pallets. Any change in position of the double pulley which affects the direction of force O I is twice as effective in changing the direction of the resultant as a similar movement of the single pullet which alters the direction of single force OB. The potractor is again employed in this maneuver, by placing its fulcrum at the elbow and directing its arms toward the pulleys to locate O I and OB and so calculate OV. The pulleys can then be moved without disturbing the continuity of traction so as to obtain the desired direction for the resultant of obtain the desired direction for

In this connection it may be mentioned that when the pulleys are approximated 1e, when angle 40B becomes smaller, the force of the resultant (O V) becomes greater and vice versultant when the seem of the custom to move both pulleys when necessary thus leaving angle 40B unchanged

Posterior angulation is rare, occurring once in 24 cases arising as a result of simultaneous over pull and maladjustment of the angles. Lateral angulation is referable to the degree of abduction and may also be present with slight overriding

From this description of its proved functions it can be readily appreciated that double puller traction possesses those mechanical traits which make it an easily adjustable definitive method o obtaining axis traction

ADVANTAGES AND LIMITATIONS

Our experience with this apparatus has been particularly gratifying because it has revealed that double pulley traction when properly and pertinently used does work. In short, a discussion of its angles, forces, and resultants does

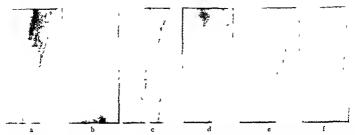


Fig 4. Case 2 a, Anteroposterior view \(\) ray film taken after 13 hours b, Lateral view c Anteroposterior view Angles have been adjusted to correct axis \(\) \(\) ray

film taken at 4 weeks d Lateral view e, Interopos terior view Roentgenogram taken at 8 months f, Lateral view

not constitute a pretty speculative gossip, but represents the effective application of the simplest laws of physics to a clinical problem

The advantages of double pulley traction are

It is a comfortable, easily adjustable form

of axis traction which can be used in definitive fashion for the treatment of fractures of the distal half of the short of the humanis

distal half of the shaft of the humerus

The entire arm is exposed thus facilitating

the care of any soft tissue wounds, the taking of roentgenograms, and the application of physiotherapy to the injured area

3 This apparatus is equally applicable to children and adults since there is no trauma to bone (as is the case where pins and wires are

used), no irritation of the skin, and no residual injury to the neighboring joints

4 Its use does not interfere with the proper care of shock, nor does it hinder the simultaneous treatment of other injuries

Its disadvantages are

r As a method of permanent extension, it requires the constant supervision of the house and nursing staffs

2 As a peculiarly effective form of traction, it is prone to cause overpull unless it is carefully

watched

3 The average period of hospitalization is 6 weeks (This is not to be confused with the period of disability which is probably shortened)

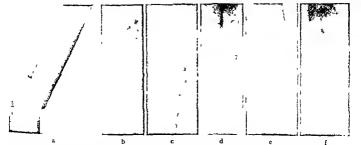


Fig 5 Case 3 a Anteroposterior view \ ray films taken on admission b Lateral view c Anteroposterior view \ \text{Anteroposterior} \text{ Anteroposterior} \text{ Anteroposteri

at 3 days d, Lateral view e, Anteroposterior view Roentgenogram taken at 3 months f, Lateral view

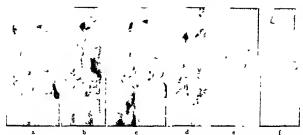


Fig 6 Case 4 a Interopo terror view Gun hot wound \ ray nlm taken at 15 hours b Lateral view c Interoposterior view Wounds healed. \ ray film

talen at 4 weeks. d. Lateral view e. Anteroposterior view Roentgenogram which was talen at 4 months. f Lateral view.

The indications for its use have been arrived at, and properly so on an empirical basis. This will be evident in the following case reports

be evident in the following case reports

In our experience double pulley traction has
proved a method of choice in the treatment of
fractures of the shaft of the humerus below the
deltoid tubercleandof compounded fractures in any
part of the shaft

CASE REPORTS

The tollowing cases have been treated by members of the surgical staff of the Beekman Street Ho-pital, each surgeon using the apparatus where and when he thought it indicated.

CASE (Fig. 3) FS a robust 37 sar old white male, was admitted to the hospital on April as, 19,6 shortly after being struck by a cab. He suitered a trans-ere-first ure in the modelly infried of his night humen. Admission x ray oldes recealed marked angulation with over-fining despite strong emergency traction. Meter 6 hours in 3 pound double pulley traction there was still 3 and not a constraint of the strong as a degree angulation on the lateral view. We also have the suiteres as a correst angulation on the lateral view. We also have the suiteres of the angulation of the lateral view. We also have the suiteres of the angulation of the lateral view. We also have the suiteres of the angulation of the lateral view. We also have the suiteres of the angulation of the lateral view.

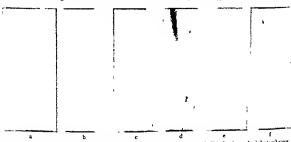


Fig 7 Case 5 a Anteroposterior view \ ray film taken at 27 days. Weight reduced. Angulation b Lateral view c, Anteroposterior view \ ray film taken 2 weeks

later Angles adjusted. Weight changed d, Lateral view e, Anteroposterior view \ ray film taken at 6 months f Lateral view

Sawai Mi

the weight was reduced to 4 pounds but despite this, overpull became apparent on the fifteenth day was visible on the twenty fifth day and by the thirty second day, the fragments had been re approximated but with some angulation. There was a complication of phlebitis in the right leg with subsequent pulmonary embolization which prolonged the hospital stay until July 11, 1036 Because of the overpull, chaical union was delayed until June 25, 1937

This case exemplifies the efficient function of the apparatus in correcting angulation. Despite care in trying to avoid its occurrence, overpull did take place, with its usual sequelæ of de layed union and prolonged hospitalization

CASE 2 (Fig 4) CF, a 30 year old white male was admitted to the hospital on October 15 1934 shortly after a fall on his left arm. He had a T fracture which began near the middle of the shaft of the humerus and extended into the elbow joint thus separating the capitel lum and trochlea \ ray films showed a 25 degree antenor angulation after a few hours in 5 pound double polley traction. The angles were adjusted and at 48 hours the almement was improved to one of 5 degrees of deviation A cock up splint was applied to the wrist because of symptoms of radial nerve contusion. The position was main tained for 17 days, at which time the callus was satisfactory and union sufficiently firm to discard the traction. He was discharged on November 25 1934 I ollow up examination at 2 years showed an A4, E4 F4 result

This type of fracture is a most difficult one to handle. The excellent anatomical and functional result is a tribute to the efficacy of this apparatus In particular, the attainment of complete, painless elbow joint function is worthy of note

CASE 3 (Fig 5) JR, a 66 year old white male, was admitted to the hospital on October 5 1934 several hours after falling down a flight of stairs Roentgenograms showed an oblique fracture in the middle third of the right humerus with definite angulation. After 36 hours of 5 pound double pulley traction, some angulation persisted accordingly the pulleys were adjusted and the weight increased to 7 pounds. Twenty four hours later anatomical almement was attained and the original 5 pound traction restored because of slight overpull. An excellent position was maintained for 53 days in traction because of delay in union (overpuil) Some callus had been evident at the twenty fourth day The patient was discharged on Decem ber 1 1934 Follow up examination at 5 months revealed complete function of the shoulder except in the extremes of rotation and all other joints were normal. An A4 F4, F3 (unemployed) result had been obtained

CASE 4 (Fig 6) J C a 39 year old white male, was admitted to the hospital on March 21, 1934 20 minutes after his left upper arm had been shattered by a charge of buckshot. There was an extensive, compounded, com manuted fracture of the upper third of the left humerus following cleansing of the wounds the extremity was placed in 4 pound double pulley traction. The fragments were maintained in this fashion while the arm was left free for dressings throughout the period of hospitalization Callus was evident at 26 days and the wounds were healed t week later The patient was out of traction on the forty third day Follow up examination at 10 months revealed an A4 E4, F4 result

(Lise) (Lig 7) VS 1 46 year old white male, was admitted to the hospital on May 1, 1935, shortly after falling from a ladder. He suffered a short oblique fracture in the middle third of his right humerus. For the first 16 hours, 7 pound double pulley traction was applied At the end of that period, there was a suggestion of over pull and the weight was reduced to 5 pounds, and the abduction increased from 45 to 75 degrees. By the twen tieth day the weight was reduced to 3 pounds in an effort to correct the overpull, but this resulted, despite increasing callus, in an angulation of 25 degrees by the twenty sixth day Correction was obtained by restoring the weight to 6 pounds without disturbing the angles firm union in the anatomical position was present by the day He was discharged on June 21, 1935 examination at it months should an A4, with the elbow joint deficient in the last

This case demonstrates that o to occur when more than 5 t used Once overpull is prese be gained by reducing the we with the angles The end r

to the hospital on March 5 downstairs striking her le communuted impacted fr tomical necks of the lef placed in 5 pound dou abduction. On the sec tion did not affect continued until the used The fracture of the fourth we tained Traction was discharged 7 months sho rotation but

Case 6 E L , a 48 year old

pulley t ing su alme This

This c

extension

satisfactory

IEVe3 patient w and he was tra

CASE 8 NR, a to the hospital on Febr struck by an automobile tures of the body and neck of the

collapsing type of injury so that the the head of the humerus lay in the anteno left upper extremity was placed in full abducti pound Blake board traction suspension. At 3 days there was som-improvement but the skin of the arm began to blister. At 10 days 3 pound double pulley traction was mistitude for two reasons. First the brachard slin was breaking down and second a more elective pull was removed in the state of

This case demonstrates the advantageous use of double pulley traction without regard to its axis traction qualities. An effective comfortable pull of 11 pounds replaced the skin damaging 7 pound (effective 4 pound) pull of Blake board extension.

Case of P a 13 year old white female was admitted to the hospital on May 31 1933 a Rev magnites after things or a box and sustaining an arregularly transverse dilling or or a box and sustaining an arregularly transverse things of the second

A Case of the control

This was our first case. The trouble with the extra sing proved a fortunate event since it demonstrated that angulation could be promptly corrected by proper adjustment of the angles.

Case 11 JC at 1, lear old white male was admitted to the hospital on August 6 1793, shortly after his right arm had been caught between two trucks resulting in a transverse fracture in the middle third of the humenus. The extremity was placed in 3 pound double pulley traction. Roengrenograms at 0 hours reteated a 20 degree anterior angulation. The policys were then adjusted to complete the resultant. It a days the frequency of the resultant was placed to a pounds to avoid neighbor. The weight was reduced to a pounds to avoid neighbor. The weight was a fara moment of callus present. It? I we take among was a fair amonant of callus present. It? I we take among was solid and the patient was discharged. Follow up cammatation at 1x months revealed and A t Ex Fastait.

This patient was maintained in traction for so long a period because of his lack of co-operation

Case 12 LC a 65 year old white female was admitted to the bo pital on June 22 1956 with a fresh oblone fracture in the upper third of the right himners. The extremity was placed in 2 pound double pulley fraction. There was some angulation which was still present at the elevanth day, when because of the danger of hypostate pneumonia 5 pound Blale board traction was substituted. In this way the patient could be proposed up 00 the tamity fifth day, a plaster spica was applied and the patient was descharged on July 15, 1936.

This case was one for an ambulatory method of treatment from the start. Unless the criteria for the proper use of double pulley traction can be satisfied, its use is contra indicated.

CASE 13 BR a 48 year old white made was admitted to the boughted on Viscria ps 300 20 minutes site falling from a ladder. He sustained a shall fracture with brain anyun an addition to a communited fracture of the surgical of pound libke board extension. After 1 week the size of pound libke board extension. After 1 week the size of the surgical extension of the size began to break down. Since bed rest was still enforced by the cramsal injury, it was felt that the arm might as well benefit by continued carciam. Therefore a tracting explicit of the continued carciam respectively and the size of the siz

of internal notation. The cibors was mornal.

CAST 14. J F a 43 year old white male was admitted to the hospital on January 30 1056 siter being cought between two trucks. He suffered multiple injuries and shock as well as a short oblique fracture through the muddle therd of the left humers. Because of angulation and overriding 6 pound double paile; insteads applied Viter several hours overpull was reduced on the roentgenogram and the warph was reduced on the roentgenogram and the warph was reduced to the roentgenogram and and on the filterability the patient a condition was subsciently good to allow of open operation. Than plate was inverted and contalexance was satisfactory. Callus appeared on the thirty seventh 433 and the patient was discharged on Variat 12 1956.

This case can be summarized with the one word "overpuil'. Where the patient is energated by shock or multiple soft tissue injuries, particular care must be taken not to apply too much weight

Cases 3. HF a 603 year old white mule, was admitted to the ho put had no flay as 103, shortly after slipping on the sirred and sustaining a communited fracture through the upper that of the right humerus. The extremity was placed in 5 pound double pulley traction and an excellent opsition was obtained and maintained. On the treatieth day callus was evident and the weight was reduced to 2 pounds Traction was removed on the thirty first day and the patient was discharged with the arm in computation.

Case to R.P. a 50, Sear old white male was admitted to the hospital on January 2: 10,5, with a haboty of having fallen against a deals, several hours before Rorat genograms revealed an impacted fracture of the surgical neck of the right humerus also involving the greater

tuberosity Double pulley traction of 6 pounds was applied because of the impaction. The extremity was gradually abducted with the fragments in good position. However his general condition was not deemed satisfactory and a plaster spica was accordingly applied in order to get the patient out of bed. He was discharged in this on February 4, 1935.

In general, there would seem no indication for the use of this apparatus in fractures of the upper shaft and surgical neck, unless compounded. In this case, it was employed merely as an effective comfortable means of obtaining strong traction

CASE 17 SR., a 69 year old white male was admitted to the hospital on November 10, 1936, shortly after being run over by a truck. He suffered multiple fractures including a compound apiliercof fracture in the lower extremity of the right burnerus. The patient was treated for shock, as well as for the local injuries. Blake board traction of 4 pounds was applied to the right arm. After 48 hours: It was evident that this was madequate and 4 pound double pulley traction was used. Roentgenograms after 72 hours revealed definite improvement with good almement and approximation of the condyles. The soft inside was readily dressed and remained clean. At the end of a weeks, the patient expired because of broncho pneumonia and exhaustion.

This case again serves to demonstrate that double pulley traction is most effective in the distal half of the humerus

Case 18 FT, an 18 year old white female was admit ted to the hospital on January 10, 103, with an irregularly transcrise fracture through the surgical neck of the left huncrus. Because of the marked impaction with some malahiement, 5 pound double pulley traction, in 30 degrees of abduction, was applied. After 24 hours angulation with rotation was evident and a manipulation under anesthesia was necessary. On the fifth day, a second manipulation was performed, without success. Twenty four hours later a third manipulation was done with sourcessful retention by extending the extremity directly overhead. It was retained in this fashion until the twenty third day. The patient was discharged on February 6 1935. Follow up examination at 4 months revealed compites shoulder function.

Double pulley traction was used here because we had as yet not learned that it had nothing to offer in the treatment of simple fractures proximal to the deltoid tuberosity

CASE 19 MA, a 20 year old white female was admit ted to the bepintal on Gotober 1, 1936 after falling 4 stones to the street. She suffered 5 major fractures in addition to a compounded, communited, superscond) just fracture of the right humerus extending into the point flee attentity was placed in 3 pound double pulley traction. The original position was one of overriding of the fragments with separation of the condyles and a 20 degree afterior angulation. Within 24 hours this was corrected to one of good almement, complete correction of the angulation, and approximation of the condyles. This position was maintained until the patient expired on the sixth day

In this type of fracture, double pulley traction is the optimal method of treatment because

plaster retention would be ineffective due to slipping, manipulation is impossible because of the hazardous condition of the patient, and finally the soft tissue wounds can be satisfactorily dressed

Case 20 F.R., a 28 year old white male, was admitted to the hospital on April 5, 1034, a bour after being thrown from a horse. The injuries were confined to the left upper extremit. They were a transverse fracture in the upper third of the humerus, fractures of both radial and ulnar stylond processes, fracture of the maveular, and dislocations of the os kinatum and os magnum. The carpaily an unsuccessful attempt was made to reduce the humerus fracture, but the fragments could not be maintained in position. Accordingly, the arm was placed in 6 pound double pulley traction in adduction. On the fourth day, another manipulation was unsuccessful. At the end of the second week, when the skin was in good condition, an open operation with insertion of a Lane plate was performed. The patient was discharged on May 17, 1914 Follow up examination at 18 months revealed an A4, E4, F4 result

It is a clinical fact that any form of traction is ineffective in the reduction and maintenance of transverse fractures just below the surgical neck of the humerus

CasE 21 TW, a 41 year old white male, was admitted to the bospital on November 8, 1938 several hours after a fall in the street. He suffered an oblique fracture in the middle third of the right humerus. The extremity was placed in 6 pound double pulley traction in a 30 degree abduction. At the end of 48 hours, the position of the tragments was improved. At 5 days, a manipulation under general anesthesia was deemed necessary. At four weeks, the weight was reduced to 4½ pounds, and there was fair callus formation. Traction was removed on the thirty third day, union was solid. The patient was discharged on December 17, 1934. Follow up examination at 5 months revealed an A3, F3 (out of 1901) result.

CASE 22 MR, a 38 year old white female, was admit ted to the hospital on December 9, 1935, shortly after falling downstairs. She sustained an oblique fracture in the lower third of the shafet of the humerus. The arm was placed in 6 pound Blake board traction. At 6 days there was a persistent 20 degree anterior angulation. Double pulley traction of 4 pounds was then applied. Within 24 hours, the angulation was corrected and the alimenter remained good until she was discharged from the hospital Tollow up at 8_months revealed an 14, F4, F4 result.

Case 22 CS, a 55 sear old white male, was admitted to the bosputal on January 27, 1916, after a fall from an elevated platform. There was a communited oblique fracture of the upper third of the right binnerus extending into the surgical neck, with considerable rotation of the fragments. Double pulley traction of 5 pounds was applied in full abduction. The following day, a manipula tion under local anesthesas was performed and traction was resumed. The improved position was maintained with 3 pounds, after the fifth day. Callus was evident at 4 necks and the patient was discharged on March 23, 1936, with a returning function of the shoulder.

CASE 24 11, a 21 year old white female, was admit ted to the bospital on August 28, 1934, shortly after a fall. She sustained a fracture of the surgical neck of the left humenus. The extremity was placed in a pound double pulley fraction the arm being gradually abducted to go degrees within 24 hours. At this time, r ray examination showed a medial angulation of 30 degrees obviously due to the abduction. The weight was increased to 5 pounds on the eleventh day, an anapulation under general anexiliests and the second of the second o

Double pulley traction has nothing to offer in the care of a fracture of the surgical neck, unless there is a soft tissue wound and extension is otherwise indicated

CONCLUSION

The indications, advantages, and limitations of double pulley traction are presented on the basis of its use in the treatment of 24 cases of fracture of the humerus. It has proven itself to be a definitive, axis traction apparatus which gives excellent results when properly employed.

UTERINE CURETTAGE AS AN AID IN THE DIAGNOSIS OF ECTOPIC PREGNANCY

R S SIDDALL M D and CHARLES JARVIS, M D Detroit Vichigan

LTHOUGH extensive investigation has been devoted to the diagnosis of ectopic preg nancy the variable clinical aspects of the condition still offer many difficulties in its recognition. Indeed different studies give the incidence of incorrect diagnoses as ranging from 15 to 40 per cent In doubtful cases with obscure symptoms and signs provided there is sufficient time, properly interpreted pregnancy tests can sometimes be of assistance report by Hope indicates that peritoneoscopy (lap aroscopy) may become a valuable aid One would think that this procedure, if it proves to be not too difficult or dangerous should at least displace aspiration by needle of the posterior cul de sac for the discovery of free blood in the pelvis

In 1036 one of us published an article (7) on the association of decidual reaction of the endometrium with extra uterine pregnancy in which it was concluded that in the case of at least some patients the findings at uterine curettage could be of considerable value in differential diagnosis The material for this investigation consisted of the patients with extra uterine pregnancy who were operated upon at Harper Hospital during the 5 year period ending March 31, 1935 An examination of patients with similar conditions occurring in the next 2 years was found to con firm the first in all essentials. For the present study, then the two groups are combined thus giving a more substantial series for statistical purposes

From the Department of Ob tetres and Gynecology Harper Hospital In the previous article a review of the literature showed a remarkable disagreement among authors of textbooks as to the diagnosus usefulness and reliability of curettage in ectopic pregnancy Some stressed it as important, others as unreliable Still others thought curettage too dangerous actra uterine pregnancy for use in diagnosis Many made little or no mention of the procedurand the same can be said for authors of articles in the periodical hierature. A recent exception is Valchieu, who found curettage of great diagnosis.

assistance in 2 cases.

Considering the dangers first a rather careful review of the literature for the last 10 years yielded no convincing data to support the opmon noted above. Moreover, in the records of our cases there was nothing to indicate that curttage had been harmful. Indeed, it does not seem that a properly performed curettage should be as hich a cause of rupture of the pregnant tube as the usual bimmanual pelvic examination.

If it is true, then that curettage is not unduly dangerous, the importance of the matter is to be found in the degree of reliability or usefulness of the procedure. Again referring to the previous paper, it may be considered as established that in any pregnancy, uterine or extra uterine, the endometrium undergoes characteristic decidial changes. With uterine pregnancy there will be fetal or choriomic tissue (choriomic villi) in addition to decidua. The presence or not of choriomic villi has long been considered as possibly significant in differential diagnosis. Later observations have shown that, though there may be a

slight chance of error, the presence in the iterus of decidua alone is at least strong presumptive evidence of evtra uternie pregnancy. On the other band, the absence of decidual changes in the endometrium cannot be taken as dispendable evidence against ectopic pregnancy, since the decidual is usually cast off subsequent to death of the ovum. The latter, though no longer developing, may still be a cause of internal bleeding. However, even in such event, the absence of villa in the findings at curettage, and regardless of the type of endometrium, could be of distinct value at times in ruling out uterine abortion as a cause of the symptoms.

In view of the foregoing evidence that curettage is not unduly dangerous in ectopic pregnancy and that it can possibly be of considerable diagnostic assistance in obscure cases, we have studied the 38 Harper Hospital cases of definite extra-uterine pregnancy with available specimens of endometrium. These were found among the 171 patients who were treated by operation during the 7 year period ending March 31, 1937. In each instance the diagnosis was proved by the extra-uterine presence of a fetus or choronic will. The specimens of endometrium for the 38 cases were obtained by uterine curettage in 29, by hysterectomy in 6, and by decidual cast or discharged fragments in 3.

By accepting for study none but proved cases of ectopic pregnancy, we have attempted to avoid possible errors in some of the other reports Furthermore, the specimens of endometrium from our cases were diagnosed in the laboratory before the full hospital records were consulted in regard to the duration of bleeding and other clinical features Nor, do we question the reliability of the majority of the histories as the women were, with two exceptions, private patients and therefore probably for the most part sufficiently intelligent and informed to give a good account of their symptoms We bave indicated indefinite or questionable data in Table I by plus and minus signs or question marks. It is unfortunate from the standpoint of accuracy that we have been able to trace, for comparison, only a few instances of suspected extra-uterine pregnancy with curettage, but in which some other condition was found at operation Some of these were incomplete abortions with decidua and chorionic villi in the curettings, in no case was there intact decidua alone

In Table I the 38 Harper Hospital cases are arranged according to days elapsing between the onset of abnormal bledding and the time when the endometrium was obtained. There is also shown the number of days since the last normal men-

TABLE 1—HARPER HOSPITAL CASES OF ENTRA-UTERINE PREGNANCY—SHOWING DURATION OF VAGINAL BLEEDING AND TYPE OF ENDO-MITRUIM

MET	RIUM			
Harper Hospial Case number	Specimen abtained by	Last menstrual period— Daya before specimen obtained	Onset of hemor rhage Days before specimen obtained	Endometrium Type or phase
t 75gt8	Cusettage	49	1	Intact decidua
2 84917	Curettage	50	4	Intact decidua
3 96097	Curettage	54	4	Intact decidua
4 57104	Pieces expelled	66	S	Intact decidua
5 50150	Curettage	48	5	Intact decidua
6 132863	Curettage	56	7	Intact decidua
7 143117	Curettage	35	7	Intact decidua
8 144637	Decidual cast	46	8	Intact decidua
9 131450	Curettage	42	9	Intact decidua
10 114405	Curettage	67	10	Intact decidua
11 112973	Decidual cast	64	11	Intact decidua
12 117729	Curettage	48	11	Proliferative
13 93097	Curettage	45	13	Intact decidua
14 90394	(urettage	\$2	7.4	Intact decidua
15 103507	Curettage	207	14	Proliferative
16 129130	H) sterectomy	42	15	Intact decidua
17 87922	Curettage	7	18	Intact decidua
18 103241	Curettage	777	18	Proliferative
19 63808	Hy terectomy	65	23	Intact decidua
20 129918	Curettage	72	23	Proliferative
22 43178	Curettage	25?	25	Early decidua
22 113463	Curettage	62	27	Proliferative
23 144919	Curettage	48	28	Intact decidua
24 138922	Curettage	70	28	Prohierative
25 117457	Hysterectomy	62	28	Proliferative
26 143043	Hysterectomy	63	28	Proliferative
27 111783	Curettage	51	39	Early secretory
28 57021	Curettage	Do+01-	30	Early secretory
29 88276	Curettage	76	32	Decidual glands
30 41510	Hysterectomy	75	34	Intact decidua
31 113045	Curettage	79	34	Proliferative
32 80620	Curettage	563	32	Intact decidua
33 127346	Hysterectomy	-	56	Proliferative
34 47228	Curettage	3177	63?	Middle secretory
35 97039	Curettage	01+01-	65-1-01-	Intact decidua
36 125414	Curettage	140	70	Proliferative
37 131261	Curettage	109	72	Proliferative
33 113305	Curettage	146+0F-	85+or-	Proliferative
				'

TABLE II —FIVE SERIES OF ETTRA UTERINE PREGNANCIES SHOWING INCIDENCE OF DI-CIDUA ACCORDING TO ONSET OF ABNORMAL BLEEDING BEFORE ENDOMETRIUM WAS OB TAINED.

TAINED				
Onset of abnormal bleeding be- fore specimen secured	Series	Cases	Decidua	Percent age
one to a week	Sampson Geist and Matus Moratz and Douglas Boerner Harper Hosp tal Total	11 12 11 12 11 7	10 10 7 31	92 9 16 7 92 9 100 0
3 dats to s w els	Sampson Get t and M tus Mor tz and Dougus Roerner Harper Ho pital Tutal	3 12 11 4 8	1 7 2 1 6 6	33 3 56 3 18 2 25 0 75 0
5 days to 5 weeks	Sampson Geist and Matus Mortes and Douglas Roetner Harper Ho pits! Total	3 6 7 3	9,1,1,2	31 3 16 7 28 6 66 7
12 d352 to 4 weeks	Sampson Gest and Matus Mo its and Douglas B eczer Harper Hospital Total	\$ 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0 (15 0 50 0 8 3 7 0 37 5
10 d 31 to 12 works	Sampson Geist and Matus Monte and Douglas Boer er Harper Hospital Total	13 6 3 17 12	9 1 4 4	33 1 10 7 0 0 33 1
	All cases	185	11	38 0

strual period, the method by which the endome trium was secured, and the endometrium type or phase It is seen that where abnormal breeding had lasted 10 days or less, intact decidua was found in every instance. After this time there was an increasing incidence of the cyclic phases of the endometrum and in one instance (Case 20) partially desquamated decidua was found How ever, it is noteworthy that intact decidua was present several times following prolonged bleed ing-with of course, the same diagnostic sigmiscance As stated before, even when intact decidua is not present the absence of choriome villi in the curettings could be taken as evidence against uterine abortion. Although this series contains too few cases for definite statistical con clusions, the results are sufficiently striking to indicate that those who have opposed diagnostic curettage in extra uterine pregnancy bave greatly underrated the value of the procedure

In the literature there are at least four other series of ectopic pregnancies which give sufficient data to permit a comparison with ours. In order of publication these are tabulated in Table II along with ours so as to show the occurrence of decidua in relation to the duration of abnormal bleeding It is evident that 3 of these series (those of Sampson, of Geist and Matus, and of Boerner) show a general agreement with ours, the differ ences being explained possibly by the small numbers involved or by different criteria in the selection of cases for study Montz and Douglas reported the only series showing little or no relationship between the occurrence of decidua and the duration of bleeding. However, even with the inclusion of their exceptional findings, averages calculated from alf 5 series (which together form a group of substantial size) indicate a high incidence of decidua with recent onset of abnormal bleeding Furthermore, it is seen that although the incidence of decidua decreases with increased duration of bleeding, this significant finding may be expected in some cases even after prolonged bleeding

The impression regarding the value of curettage standards by the clinical records of the 29 patients in our screens who were subjected to diagnostic curettage. The histories of these 29 patients show that the duration of abnormal bleeding stand from to 85 days (Table 1). The majority presented obscure symptoms and signs, 3ct in 15 there was intact decidua without choronic vill—a finding presenting a bigh degree of diagnostic probability and wefulness. The following case

was of this group

Cash, t. J. B. aged 34 years. Marned 10 years with
full term pregnancy 5 years before the present these as
miscarranges. The pregnancy of secured after. The last
menstrual period was on March 30 10,6. Beginning on
April 2 and Sating for y days there had been lower abdomaid cramps such as usually occurred with menstrua
tion. Several daws later there was a dull pain which
gradually became. But a bothhade here was a facility has well
admission shight vagnal beliefung to two mights before
admission shight vagnal beleeding to two mights before
admission shight vagnal beleeding to grant.

Patient was admitted to the bogoilal on May 17 1036 Blood pressure was 105/86 temperature 90 degree pulse, 80 hemoglobin 81 per cent white blood coat, as 10 to 00. Aldominal palpation showed diffuse tenderies below the umbities and vagnal examination and the left adoes 0.00 May 10 the Fredman reaction was positive for pregnancy. Two days later curetiats yielded alrea amount of material and the operator below the current of the many of the current of the second

unruptured left tubal pregnancy measuring 1 by 13/4 inches in which was later found a fetus. The left tube was re-moved Convalescence was uneventful, and the patient was discharged from the hospital on June 6, 1936

The following case is illustrative of the group in which decidua was not present but in which the indings were, nevertheless, of some importance

CASE 2 W B, aged 33 years Married for a number of years but never pregnant. The last regular menstrual period began on December 18, 1935 On February 21, the patient experienced a sudden lower abdominal pain The pain continued and on the following day was so severe that she fainted Vaginal bleeding began at this time and was continuous for a week "Spotting" followed and at one time clots and a sort of "skin" nere passed. This tissue was not examined microscopically Shortly after the onset of pain the Friedman test for pregnancy was positive Moderate abdominal pain continued intermittently

Because of persistence of the symptoms, the patient was admitted to the hospital on March 15, 1936 The blood pressure was 128/80, pulse, 90, hemoglobin, 77 per cent, and white blood count, 7,900 History and examination at this time suggested tubal abortion (left) or incomplete uterine abortion On March 16 examination under anesthesia revealed a mass 3 hy 3 centimeters in size ap parently attached to the left cornua of the uterus Uterme curettage at the same time yielded a moderate amount of tissue which on microscopic examination was found to be endometrium in the proliferative phase. There were no chononic villi. At abdominal operation on March 18 a "small amount of free blood was found in the abdominal cavity" The omentum was adherent to the bladder and Over the uterus, adnexa, and sigmoid After separation of the adhesions, the gangrenous left tube and the ovary were seen to be involved in old blood clot and adhesions The left tube and ovary were removed with difficulty Except for several days, on which the patient was febrile, the course following operation was satisfactory and the pa tient went home on March 28, 1030

SUMMARY

In view of the frequent difficulties met with in the recognition of ectopic pregnancy, a study was made of uterine curettage as a diagnostic aid The procedure is apparently not unduly dangerous, and the finding of intact decidua without chorionic villi is strong presumptive evidence of extra uterine pregnancy. In 38 cases of proved ectopic pregnancy with available specimens of endometrium, intact decidua alone was present in all cases with abnormal bleeding of 10 days or less and in a considerable proportion of those with more prolonged bleeding The absence of decidual reaction is not reliable evidence against ectopic pregnancy However, if chorionic villi are also absent, the findings may be of value in ruling out uterine abortion as a cause of the bleeding. Three of a somewhat comparable series found in the literature confirmed our results in large part. Two illustrative case reports are given

Note -- We wish to take this opportunity to thank Dr P F Morse for permission to use the pathological mate nal from the Laboratory of Harper Hospital

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POSTERIOR GASTROJEJUNOSTOMY

An Unusual Error in Technique

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EXTROOKS of surgery and special monographs dealing with the technique of retrocolic gastrojejunostomy not in frequently fail to give definite instruc tions for the proper placing of the anastomosis with relation to the middle colic artery example Fowler in 1006 stated. A slit is made in the transverse mesocolon at the point where it is in relation to the po-terior wall of the stom ach Moyniban in 1908 wrote "The jejunal direction being carefully noted, the transverse mesocolon is divided at a spot devoid of blood vessels close to the duodenojejunal flexure" Mayo-Robson in 1910 said, A vertical slit is then made in the transverse mesocolon between the blood vessels which are readily seen ' Moy nihan in 1004 again wrote. 'At a bloodless spot in the arch of the middle cohe arters a clip is applied to the under surface of the mesocolon " In 19 o Warbasse described the procedure as follows. 'A small vertical incision is made in the mesocolon at this point between the blood ves sels. The point referred to is the under surface of the mesocolon which is made to bulge when the stomach is pressed forward against it. Bickham in his Operative Surgers, 1934 is more accurate he writes. The mesocolon is caught with forceps and drawn away from the posterior storn ach wall while its structure is divided by knife or scissors through a non vascular area just to the left of the duodenojejunal junction 1928, gave this description 'The stomach and transverse colon are lifted out of the wound making taut the transverse mesocolon which is divided for 7 centimeters between vessels expoing the posterior wall of the stomach and Mitchiner, 1929 say, A large opening is made in the mesocolon at a bloodless spot and the posterior wall of the stomach is pushed through In Nelson's Surgery Walton states 'The mesocolic artery should be identified and the bloodless area to the left of it freely incised " and Horsley in Lewis Practice of Surgery says, 'An incision is made in the mesocolon about the midline or slightly to the left, avoiding the large

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blood vessels" Babcock's Textbook of Surgery, 1935, evidently quotes from Horsley, 'The stom ach and transverse colon are lifted out of the wound making taut the transverse mesocolon which is divided for 7 centimeters between the vessels exposing the posterior wall of the stomach " Probably the most complete description appears in a recent monograph by Eusterman and Balfour, 10.6. The transverse colon is then elevated and the mesocolon inspected for the most suitable area through which the segment of the stomach elected for the anastomosis is to be drawn and in this selection there is usually no difficulty sionally, however, there may be a choice in the arcades of the mesocolon as they have been formed by vessels of the branches of the mesocolic vessels if there is, the arcade farthest to the left side of the patient should be chosen"

to special emphasis apparently seems to base

been given to a discussion of possible dire results, if this point be disregarded and the anastomosis be made through the mesocolon to the right of the middle colic artery \ review of the literature since 1001 fails to reveal any mention of instances of malfunction due to occlusion of the jejunal limbs by the vascular pedicle as a result of failure to place the anastomosis to the left of the middle colic vessels It will be remembered that the middle colic artery is a branch of the superior mesentene arters which latter springs from the front of the aorta just above the level of the root of the transverse mesocolon (Fig. 1) This middle colic artery is a vessel of quite some importance masmuch as it carries the blood supply to the middle portion of the colon and, if it is injured, it is probable that the consequence will be serious It is accompanied by the middle colic vein which brings the blood hack from the same portion of the colon, pouring it into the superior mesenteric vein, which latter, joining the splenic, forms the portal vein These two vessels, then-the mid dle colic artery and vein-form in the mesocolon a strand of some thickness, the artery at its beginning being about as thick as the brachial, and the vein is correspondingly large. One can now understand that when the individual stands or sits the transverse colon sags and the middle colic

artery is brought closer to the superior mesenteric artery from which it springs Of course, when seen during the performance of this operation, a wide interval separates these two arteries, perhaps more than a right angle, depending on the dis tance to which the colon has been drawn up Now the duodenum, as it goes on to become the jejunum, passes behind the superior mesenteric artery If one remembers this he can easily visualize what happens when the first 3 inches of jejunum are picked up and drawn to the right of the median line (Fig 2) The loop, both limbs of it, must come to he in front of the superior mesentence artery If now, while it is thus drawn over to the right of the midline one were to return the colon to its natural position, the loop-both limbs of it-would be constricted between the middle colic vessels and the superior mesentene vessels, as though between the blades of a clamp or seissors (Fig 2a) But, furthermore, if now the summit of the loop is made to pass through the mesocolon to the right of the midcolic vessels and is then fastened to the stomach to the left of the midline, the constricting action of these vessels is intensified And now, the summit of the curve is, we think, practically always anastomosed to the stomach to the left of the midline (as it should he whenever possible) Thus our loop will have made a half circle around the vessels—the mid dle colic artery and vein-and the more the stomach falls away to the left-as in the act of filling-just so much the more must the midcolic vessels constrict both limbs of the loop, and also just so much the more must the vessels be con stricted by the loop. If the stomach is sewed firmly to the edge of the opening in the mesocolon and adheres firmly to it, the condition will be bad enough, but surgeons of experience know these

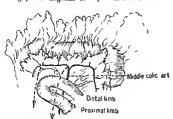


Fig 2 One can visualize what happens when the first 3 inches of jejunum are picked up and drawn to the right of the midline

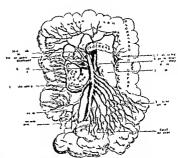


Fig. 1 This illustration shows how the middle colic artery and vein and the Juperior mesentieric vessels are widely separated when the transverse colon is drawn up and indicates the manner in which a loop of jeginum could be compressed as between the arms of a pair of pincers on replacement of the colon were the gastrojejunal anastomosis made to the right (patient's) of the middle colic vessel's (Viter Jackson')

two do not always adhere strongly and that, in fact, it is common enough to find a goodly loop going through and up to the stomach—cven when a 'no loop' operation has been done, and if such should occur after the opening in the mesocolon is made to the right of the middle colic vessels the results are more likely to be poor

The following is a report of a patient studied by us in whom pain and regurgitant vomiting occurred as a result of obstruction to the proximal

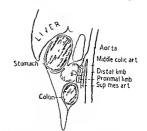


Fig. 2a. When the colon is returned to its normal position, both limbs of the loop are caught between the middle colic vessels and the superior mesenteric vessels as between the blades of a clamp or scissors.



dilatation of the duodenum and the pastro-entero tomy stoms. Barnum was seen to leave by the di tal limb but did not enter the proximal limb. Uld entero-enterostomy not functioning. reverse peristal is active in duodenum

and distal limbs of the loop of the jejunum due to failure to observe this principle

HC male white 32 years of age was admitted to the Firmin Desige Hospital on Januars 22 1936 complaining of pain in the epiga trium and of indigestion. Since years previously on October 27 1927 in another institu tion this patient had a posterior gastro-enterostomy and an appendentomy performed for duodenal ulcer Shortly after operation he developed regurgitant somiting which on lovember 7 1027 required a second of eration for relief. An operative note made at that time stated that the omentum and transverse colon were firmly adherent to the line of incision on the right side and that the proximal loop of the jejunum was considerably distended and kinked at an acute angle by adhesions to the stomath. There was also an apparent obstruction at the gastro enterestomy stoma. This was relieved by an entero-enterostomy made between the proximal and distal loops of the jejunum The incluon was made to the left of the midline as the first operative wound had become infected. The patient immediately was relieved of his acute ob tructive symp toms but continued to have attacks of epigastric pain at intervals as before Since 1933 following an injury to his back in an automobile accident his gastro-intestinal symptoms have become progressively worse. The earlier attacks were relieved by food and bicarbonate of soda but at present these are of no benefit and the pam is almost constant with acute exacerbations at times of more severe pain radiating to the shoulder blades a sociated with somiting. In the past month he has lost



lig 3a. Postoperative gastne roentgenogram The duodenium was now able to empty satisfactorily through the enlarged entero-enterostomy. The gastro-enterostomy is functioning fairly well as before

strength and at feat, to pounds in weight. Family and past histories are irrelevant to the present compliant. On physical examination the patient appeared under nounsfield and in considerable dutiers because of part in the upper abdomen. The head and nack were negative and an advantage of the manner of the patient and the patient and the patient and the patient and the patient and the patient and the patient and the patient and the patient and the patient and the patient and the patient and pa

On laboratory estimatation the unnalysis was negative. There were 30 col uncorytes; 3,0 coo en enthroptes and 33 grams hemoglobin. The differential blood count was 13 method. The blood Wasserman and kahn testis were negative. The blood nos protein nitroern was 37 milligrams per 100 cubic centimeter and the Ilood sugar are 38 milligrams per 100 cubic centimeter. As are entirely showed free and combined acids within normal storage of the state of the storage of the sto

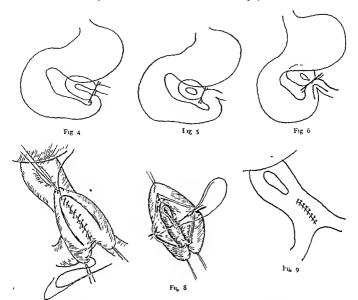


Fig 7

Fig. 4 Probable sequence of events in this patient at the time of the original operations. The anastomosis has been made to the right of the middle colic vessels. The two jejunal limbs are compressed and obstruction developed rapidly.

Fig 5 An entero-enterostomy hetween proximal and distallimbs is done with relief of obstructive symptoms

through the distal loop of bowel. It did not enter the proximal loop. There was a deformity of the first part of the diodenian with associated tenderness and fixation due to adhesions. The barnum passed through the pyloric ring of the stomach into the duodenium. The second and thard portions of the duodenium were disted and showed evidence of reverse peristaliss. The barnum in this loop of bowel did not pass through the old entero-enterostomy stoma, which was sugge_the of an obstruction there. A diagnosis of duodenal ulcer and malfunction log geative enterostomy with chronic duodenal obstructions.

was made and exploratory operation recommended.

While the patient was being prepared for operation a furuncle was discovered in the region of the proposed line of incision.

This was opened and a small amount of pus

Fig. 6 The entero enterostomy gradually becomes constructed with recurrence of obstructive symptoms. The solid hine indicates the site of the new corrective anastomosis.

Figs 7 8, and 9 Steps in the operative procedure A Funcy pyloroplasty type of anastomosis is made between the duodenum and the jejunum distal to the site of obstruction

was evacuated Operation was thus delayed As the lesion did not heal an exploration was made on March 3, 1936, and a sinus tract was found in the old right rectus This was explored and proved to be abdominal scar rather extensive. It was lined with granulation tissue and lay across the long axis of the old operative scar and led ultimately through the abdominal wall in the direction of Morrison's pouch A small amount of pus was encoun tered The anterior wall of the portion of the tract through the abdominal musculature was unroofed and packed with iodoform gauze The patient was discharged from the hospital shortly thereafter to await healing of this old chrome wound infection

He returned on June 3, 1036, and on June 12, 1936, the abdomen was explored. The scar of the first operation

was excised and the stomach and transverse colon were found adherent to the sac of a postoperative hermia Numerous loops of small intestine were freed of adhe sions and the gastro enterostomy and entero enterostomy stomas were at length revealed The gastro enterostomy admitted only 1); fingers but seemed to empty fairly well into the distal jejunal lumb but the proximal lumb of the jejunum was twisted and compressed by the middle colic vessels apparently because the anastomosis had been made to their right side rather than to their left entero enterostomy stoma had contracted to such an extent that it was ineffectual in draining the duodenum which was enormously dilated in its second and third portions Figures 4 5 and 6 show the probable sequence of events following the original operations. The anterior wall of the duodenum in the first part was scarred and firmly adherent to the under surface of the liver

The old entero enterostomy was then enlarged by making a Finney pyloroplasty type of anastomosis between the proximal and distal limbs of the jepunum proximal to the point at which the middle colic artery crossed the two jejunat limbs (Figs 7 8 and 0) The hernia was then repaired in the usual manner by imbrication. The patient had a satisfactory convalescence and was discharged from the hospital on July 4 1936 and has since returned to work. He reported on I ebruary 4 193, that he has been entirely free of all symptoms since operation and that he is able to do hard labor. The wound is firmly healed and there is no tenderness on deep palpation anywhere in the upper abdomen. On March 8 1937, the stomach was re-examined with the barium meal (Fig. 3a). The constriction at the gastro enterostomy was still evident A fair amount of barium passed through the distal limb of the gastro jejunostomy loop. The duodenum was no longer dilated and the barrum passed through the entero enterostomy opening with greater ease than before indicating an enlargement of the stoma. The duodenum was still dis torted and painful to pressure but to a lesser degree

A direct attack was not made on the ulcer itself but our efforts were directed rather toward improving gastroduodenal and jejunal mechanics There seemed to be no urgent need for taking down the malfunctioning gastro-enterostomy in asmuch as the stomach content passed easily into the duodenum through the pylorus The prime difficulty lay apparently in the mability of the The choice of entero latter to empty itself enterostomy was felt justifiable at the time be cause it was the more easily performed operation and because it was a much less serious procedure than would have been the case in any attempt to undo the two previous anastomoses. Subsequent events have shown that the results were every thing that could have been desired We are aware that it may be necessary later to deal directly with the ulcer itself. That intestinal obstruction either partial or complete may be caused by the unyielding compression of an adherent vascular pedicle is shown by the occasional reports of congenital anomalies of the duodenum with obstruction at the duodenojejunal angle Judd and White, in 1929, reported 2 such cases in which there was constriction by a band of pentoneum stretching from the superior mesenteric vein for a distance of a inches distally In one of these patients the peritoneal fold only was liberated and in the other a duodeno-jejunostomy was performed with good results

While we do not pretend to any priority in calling attention to the complication noted in our case we do believe that the principle of making the approach to the posterior wall of the stomach to the left of the middle colic artery possibly deserves more emphasis than it has hitherto been The technique of posterior gastronetunostomy has been fairly well standardized and the results from a technical standpoint are today reasonably good in most clinics, never theless at least 20 different complications due to imperfections in the technique of posterior gastrojejunostomy have been recorded in the literature Fortunately the majority of these sequelæ are rarely seen

CONCLUSION

In performing posterior gastro-enterostomy the transverse mesocolon should be opened in the arch of the vascular arcade of the middle colic artery and to the left of this vessel The opening should be made in an avascular area at a point close to the duodenoie junal flexure

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NEPHRECTOMY VERSUS CONSERVATIVE OPERATION IN UNILATERAL CALCULOUS DISEASE OF THE UPPER URINARY TRACT

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TIMULATED by certain recent chinical problems, the question of primary nephrectomy in lithiasis of the upper urinary tract was again raised. In an attempt to answer this query, the late results following pephrectomy and conservative operative procedures were determined. In this institution a systematic follow up service has been in existence since 1928 following the establishment of a unit history system in 1026 Approximately 85 per cent of the patients who were operated upon because of calculous disease between the years 1928 to 1013, inclusive, have been observed for 1 or more years, and on an average of 4 years'

Following operation, these patients were frequently examined, and a ray pictures routinely taken at yearly intervals. If the symptoms war ranted it, x-ray pictures were taken more fre quently or complete urological investigations were performed While the total number of patients is not large and an average of 4 year follow up study does not by any means give the ulumate results of operative therapy, it is felt that these observa tions will in a general way indicate the results of our therapy Since late recurrences of renal calcuh do occur, a 10 to 15 year follow up study would be a very desirable effort. Even though there are a number of such late cases under ob servation on this service, there are so many pa tients of this period who have been lost from observation, that it would be difficult to draw statistical conclusions from such a study

The postoperative care of the patients included efforts to eradicate renal infection by diet, medication, and sometimes by repeated pelvic lavage Diets were prescribed after analyses of the calculi were performed in an effort to prevent the byper excretion of the known components of the calculi removed Other diets and medication were used to control, if possible, the hydrogen-ion content of the urine To prevent recurrence of alkaline stones, acidification was desired and in the patients with uratic stones, alkalinization was carried out

From the Surgical Service of Dr Edwin Beer The Mt Sinal Hospital New York New York These statistics are based on follow up observations which

extend up to May 1936 inclusive

This study is based on 422 patients with proved renal or ureteral calculi who were admitted to the Ward Service during the 6 years between 1928 and 1933, inclusive Of these, 312 patients had unilateral calculous disease while 110, or 26 per cent, had bilateral disease. It must be remembered that there were a number of patients (between 30 and 40) each year with symptoms suggesting the presence of renal or ureteral calculi but in whom the diagnosis though suspected was not confirmed. The records of these patients have not been included in this group. If the unproved cases had been included, they would have increased the percentage of unilateral disease and decreased the percentage of bilateral disease

The term bilateral calculous disease of the urinary tract is often loosely used to denote simultaneous calculi in both Lidneys or prefers at the time of observation. In this study, a patient is considered to have bilateral disease when ealcult are known to have occurred on either side at any time as judged by the history, by the hospital studies, or by the follow-up observations I or example, although a patient at the time of observation or operation shows evidence of a stone in only one kidney, the past or later history of stone formation on the opposite side leads to the classification of the case as bilateral evaluating the statistics of this group of patients, it must be remembered, too, that they were all patients who were sick enough to be admitted to the hospital wards

In judging the comparative value of conservative operation for renal calculus, the most important questions to be answered are as follows (1) What as the mortality? (2) What is the likelihood of recurrence of calculi? (3) What is the frequency of residual calculus with further stone formation despite modern technique with operative x-ray control? (4) What are the factors regulating the frequency of recurrence? (5) What is the frequency of later secondary operation?

The statistics from this clinic are somewhat discouraging Table I contains data concerning 169 conservative kidney operations (both primary and secondary) performed in the above men-

TABLE I - ALI PATIENTS-UNILATERAL-BI LATERAL --- ASEPTIC-INPECTED CASES PRI-MARY AND SECONDARY OPERATIONS, 1928-1933

Operati n	Pyelclith ctomy	Pyclone phrolith otomy	Vephro- hthotomy	Total conserva tyse kirdney operations (a)
T tal number ope ations	ĝt.	47	37	169
Mortal ty Numb r	4 (b)	2 (c)	6 (c)	12
Percentage	4.4	4.9	16 #	7 1
Not followed	12	2	1	16
Followed	75	37	29	141
Foll wad le ca es with residual stons	67	25	17	109
Trus recurrence Number	10 (d)	8	5	23
Percentage	149	300	29 4	2f E
Residual recurrance Number	8 (d)	1	12	30
Percentage	106	314	41.4	23.7
Total true recu rance and residual Number	18		27	55
Percantage	24 0	540	48.6	390

A Util Provinces on 21 years was a Case 1 and 22 years. Sol tary right had now with dendritied feelings and acute pyreloneithritis. Patternt was in new with dendritied feelings and acute pyreloneithritis. Patternt was in several as a less considered for the patternt of a (Mao shiftered) in the provinces are because of the Case No. 19528; SM mile aged 57 years. That patternt had that did it and red undarine 5 years owners due to memority call hadder A lett in judicities now was performed for multiple stones in a hydrometric form of the pattern to have much a large descriptions hadden. Fact at the 21 and 25 lett in turns with a large descriptions hadden. cut itus alc s

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tioned 6 year period, both unilateral and bilateral, aseptic and infected cases. Of these, 141 opera tive results were followed

The indications for these operative procedures on this service are as follows Pyelohthotomy is performed for single and multiple or dendratic stones situated in the pelvis or in the calvees or in both but easily removed through the pelvis Pyelonephrolithotomy is performed for numerous stones or dendritic stones which cannot be com pletely removed through the pelvis and in which additional small and sometimes larger nephrot omies are needed to remove the calculi nephrotomy is also sometimes used for purposes of dramage Nephrolithotomy is performed for large dendritic and multiple calculi which cannot be removed through a pelvic incision and where dramage for infection may he needed, and in all cases in which the kidney cannot be completely mobilized and delivered In 33 patients, in whom there was a probability of incomplete removal of stones, operation was with x ray control according to the technique described by Beer (3)1

The mortality for pyelolithotomy was 44 per cent, for pyelonephrolithotomy 4 9 per cent, for nephrolithotomy 16 2 per cent, and the average for all the operations was 71 per cent The nephrolithotomized patients were, of course, the more acutely all and had the most advanced calculous disease with infection. In fact the 2 deaths after pyelonephrolithotomy and the 6 deaths after nephrolithotomy all occurred in pa tients with bilateral dendritic calculi. The serious ness of operation in this type of patient is thus

strongly emphasized In Tables I and II we have differentiated true recurrences from the residual or pseudorecur rences The latter are so classified when stones or stone fragments are known to have been present immediately after operation These data were obtained by routine control x ray examinations at the time of discharge from the hospital However, as far as the patient is concerned, the total in cidence of true recurrence and residual recurrence is the important factor. The incidence of true recurrence was calculated on the basis of the number of true recurrences in relation to the total number of patients operated upon and followed less the number of patients with proved residual calcult The incidence of residual or pseudorecur rence was determined on the basis of the number of residual recurrences in relation to the total number of patients operated upon and followed The true recurrence rates in the total group of patients (Table I) for pyelolithotomy, pyelo nephrolithotomy, and nephrolithotomy were respectively, 149 per cent, 320 per cent, and 29 4 per cent, the residual recurrence rates were 10 6 per cent, 32 4 per cent, and 41 4 per cent, respectively, while the totals of the true recur Since the use of this technique operative attempts orem estoses have be a made in patients who previously would not he e been surgically treated or who would have been nephrectomized

TURLE II

			3	RRL	11			-		name a
	Total number of	True lecul rence	Rest Ital	Total number less residual	Per centage true recur rence	Tetal number of	True recur rence	Residual	Total number less residual	Per centage true recur rence
Pyelohthotomy Pyelohthotomy Yephrolithotomy	All followed cares (Table I) 75 37 9	10 8 5	8 22 12	6 25 17	14 9 32 0 20 4					
Total operations	T41	23	32	100	27.2					
Pyelolithatomy Pyelone; brolithatomy Nephrolithatomy	Single stones 59 5 12	6 0 4	,	\$0 5 f1	12 0 0 0 33 5	Multiple or dendritic stones 25 32 17	4 8 7	8 12 12	17 20 5	23 5 40 0 20 0
Total operations	67	10		67	140	74		- 32		-3:5
Pyelolithotomy Pyelopephrolithotomy Nephrolithotomy	Stones with clear urine 50 14 8	5 1	5 1	45 0 7	10 4 11 1 28 6	Stones with gros ly infected urine 25 23 21	5 7 3	6 7 13	10 10 10	26 3 43 7 30 0
Total operations	72	8	8	6.	125	69	15	24	45	33.3
Pyclothotomy Pyclotephrolithotomy Vephrolithotomy	Stones urilateral 50 23 15	6	4 5 3	46 17 13	150 253 256	Stones bilateral 25 25 25 25	4 4	7 0	31 8 4	30 0 30 0
Total operations	83	13	12	6	37 1	53	10	20	- 11	303
Pyeloluthotomy Pyelonephroluthotomy Nej hroluthotomy	Stones kidney good function 57 13 13	5 4	8 4	\$3 \$ F4	0 4 80 0 28 6	Stones kidnes diminished function 18 24 11	5 4 2	4 4 8	74 20 3	35 20 0 33 3
Total operations	88	13	10	72	190	53	10	16	37	270
Prelolithotomy Psel inephrolithotomy Sephrolithotomy	Stones kidney normal structure	3	5 4	45 10 3	11 f 30 0	Stones kidney structural abnormality 25 24	5 3 2	3 8 10	22 25 9	22 7 33 3 22 2
Total operations	74			63	17.4	67	12	22	46	26 1
Pyci lithotomy Pyckacphr lithotomy Sephrolithotomy	Stoors primary operation 74 33 16	10 7 3	8 11 3	66 22	25 2 31 8 23 1	Stones secondary operation 4 13	0 1 2	9	1 3 4	33 3 50 0
Total operations	1	20	22	101	1 108	18	3	1 10	1 0	1 37 5

tence and residual rates were 240 per cent, 540 per cent, and 36 per cent, respectively. These tather horrifying figures show the importance of controlling the residual calculus situation besides the problem of true calculus recurrence. This frequency of "left over" calculi was emphasized by Barney some years ago.

The report of Cabot and Crabtree, in 1915, contained statistics which were very disconcerting Following 66 conservative kidney operations for stone, they found that 40 per cent of the patents were not well. Since this time many reports have appeared in the literature. Unfortunately, some of these do not indicate in detail exactly how the statistics were arrived at. Unless one knows the type of material studied, the duration of the

follow-up, the percentage of cases followed, whether questionnaire or prisonal and roent-genographic check up were employed, whether or not allowances have been made for residual calcult, etc., it is difficult to evaluate the reported results. At the Congress of the International Society of Urology at Rome in 1924, a symposium was presented on the late results of the operative treatment of renal calcult. Delliyes has published a comparative table of the collected statistics of these and other authors.

Because the percentage of recurrences in our series is high as compared with other recent statistical studies, the possible reasons therefore should be discussed. In the first place the patients have been very carefully and personally observed liberal in judging of recurrences Thus, if a pa tient after operation gives a history of colic on the same side with the passage of a stone, the patient is considered to have had a recurrence even though the x ray examinations are negative and the patient is well. The patients have been subsected to frequent follow up x ray examinations so that recurrences have been frequently discovered in patients who were completely asymptomatic These statistics are higher, too because the indications for conservative operation have been extended to patients who in previous years would have been nephrectomized or not operated upon at all The method of calculating the percentage recurrence on the basis of the total number of patients operated upon and followed less those with proved residual or overlooked frag ments or stones makes the rate higher than if the basis were the total number of patients operated upon alone. However this is necessary since we have no way of knowing what would have happened to the patients with residual recurrences if these had not been present. Eighteen of the 141 patients followed after operation had had secondary operations on the same kidney. Seventeen patients had had multiple operations either on the same lidney or the opposite one. Included in these are 7 patients with so called "malignant calculous disease ' These patients statistically considered elevated the recurrence rate since they showed recurrences after each of their 2 operations, and in one patient 3 operations. It must be emphasized too that only ward cases have been used in this study, or patients in the lower social strata who have not been able to look after themselves properly and who have sought advice late in their illness. Our impression is that the results among our private patients are much better The value of the technique of operative x ray control in this particular group of patients must

for an average of over 4 years We have been very

control in this particular group of patients must be recognized it must be realized that the patients in whom operative x ray control was carried out usually presented more complicated cases than those in whom it was not used, except in cases of nephrolithotomy in which the ladney could not be delivered to do an x ray control of 74 patients with multiple or dendritic calculi, operative x ray control was performed in only 33, or 44 6 per cent. At the present time, this tech mague is employed in a greater percentage of these cases. While the percentage of residual calculus was somewhat less in the group of patients in whom operative x ray control was performed than in those without x ray control, the real advantage of this procedure is apparent on con-

sideration of the following 33 patients had operative x ray controls. In 15, stones or stone fragments which could not be palpated or found without the x ray were located and removed. In 10 although stone fragments were seen on the x ray control plate, they could not be located and removed. It must be remembered that in several cases further exploration and x ray procedures were contra indicated by the seriousness of the patient s general condition while on the operating table \ ray control showed no stones or frag ments remaining in the Lidney in 22 patients This was proved to be correct in 19 patients and incorrect in 3 as venified by postoperative x ray pictures taken on discharge from the ho-pital ("discharge x ray control")

Table II classifies the recurrences (true recur rences) according to various factors for purposes of comparison For example, with single stones, the recurrence rate after pyclolithotomy is 120 per cent, while with multiple or dendritic stones it is 23 5 per cent. The uninfected or slightly in fected cases which are classified as stones with clear urines carry an average recurrence rate of 12 5 per cent for a total of all operations per formed, which is contrasted with a recurrence rate of 33 3 per cent in cases with gros ly infected urines. When the calculous disease is unilateral the operation a primary one for single stone with clear urine, and the Lidney is relatively normal in structure with good function the recurrence rate is lower, i.e., about one half of the recurrence rate when the opposite set of conditions prevul It is realized that, although tabulated separately, these factors often are naturally associated, sometimes as cause and effect Thus, stass of the Lidney with hydronephrosis will show diminished func tion and possibly gross infection.

With reference to the recurrence rate in relation to the chemistry of the removed calcul, for all operations the true recurrence rate for calcum oxalate or calcum oxalate-calcum phosphate stones is 8 x per cent while for the secondary mixed calcul, it is 28 x per cent. As regards urature calcul, it is dishcult to know whether any stone fragments have been overlooked since they are radio-transparent. Hence it is impossible to differentiate between true and residual recurrence with this type of stone

The frequency of «condary operation following conservative operative procedure for read-calcula should be noted. Of the 141 patients followed subsequent secondary operations were performed on 34, or 20 oper cent of the original number. Of these 31 operations, to were secondary conservative operations while 15 were nephrec

tomies In other words, 10 6 per cent of the folloved number of conservative operations required a subsequent nephrectomy Thirteen followed a primary operation while 2 followed secondary operations The indications for the 15 nephrec tomies were py onephrosis with or without calculi, o, chronic pyelonephritis, 1, persistent fistula, 4, and tuberculosis, I There were 55 patients, or 39 o per cent, of the 141 who had either a true recurrence or a residual recurrence. It should be pointed out that a small number of patients with recurrence required secondary operation but refused Six of the above mentioned 31 secondary operations were for conditions other than recurrence On the other hand, it should be stressed that many patients with recurrence or residual recurrence were perfectly well, asymptomatic, and presented no indication for further operation

Nephrectomy for calculous disease of the fadney or its complications was performed in 51 patients, or 12 I per cent, of the 422 patients of this series, while conservative renal operations were performed on 169 patients, or 40 o per cent Seventy-three patients had a ureterolithotomy performed while the remaining number had either non operative (such as cystoscopic) treatment or

no treatment at all

As judged by other reports, such as that of Priestley (26 2 per cent), nephrectomy has not been done as frequently here as elsewhere It has always been felt, in this clinic, that conservation which usually means conservation of renal tissue should be the guiding consideration in the treatment of renal calcult, especially in bilateral disease Because of the reported high incidence of bilateral disease, nephrectomy in lithiasis has been performed only as a procedure of last resort even in unlateral cases.

Four patients died after the 51 nephrectomes, a mortality of 78 per cent Of 34 patients on whom a primary nephrectomy was performed for an infected worthless kidney incident to calculous disease, 3 died, a mortality of 88 per cent, while in the group of 17 patients who had secondary nephrectomies performed, 1 died, a mortality of 60 per cent. There were 34 patients with unlateral and 17 patients with bilateral disease who were treated by extripation, 4 of the former and aone of the latter died after operation

The mortality of 78 per cent appears high as compared with a report of Beer (2) from this hospital in 1920. He had only 1 death after nephrectomy in a group of 49 patients with extensive destruction of the kidney due to suppuration with or without stone, or a mortality of 203 per cent Because of the present higher mortality, it is in-

teresting to review briefly in abstract the histories of the patients who died

CASE 5 No 201200 S F, male, aged 55 years, presented renal symptoms of 3 month's duration. He had multiple stones in the left kidney and a single obstructing left ureteral stone. He died 36 hours following a left nephric tomy for atrophic kidney with multiple calculi

Postmortem findings unrecognized subacute bacterial

endocarditis

CASE 6 No 289280 W G, male, aged 35 years, pre serior da history of symptoms of 3 years' duration. He had undergone 3 operations as follows. March 13, 19,0, nght pyelolithotomy, October 22, 19-6, left pyelonephro lithotomy, April 3, 1938 secondary left rephrectomy for left pyonephrosis with ureterocolic cutaneous fistula.

Postmortem findings stercoractous retroperationeal phlegmon, fistulas from descending colon and left ureter into phlegmon, phlebitis of left renal vein, right pyone

phrosis, left ureteral calculus

CASE 7 No 3,484.0 A M, ferrale aged 43 cars, presented urnary symptoms of y sears' duration A right nephrectomy for calculous pyonephrous was performed Death followed operation from hemorrhage and stock. CASE 8 No 29,116, L M, female, aged 65 years presented urnary complaints of 20 years' duration \ left nephrectomy for calculous pyonephrous was performed Death occurred 14 hours after operation, probably from cardiovascular collapse.

It will be seen that only 2 of these 4 patients had a simple primary nephrectomy performed for calculous disease of the Ludney Of the remaining 2, 1 had a complicated secondary nephrectomy and the other was operated upon because of a mistake in diagnosis

In deciding the question of nephrectomy versus conservative operation in tenal calculous disease, there can be no argument as to the advisability of extirpation in those unilateral cases in which the lidney is completely or almost completely destroyed by calculous disease with infection with no hope of return of function and in which the lidney is a permanent source of danger. The problem repeatedly arises, however, as to what procedure to use in certain borderine cases. A case with unilateral disease may present the following conditions either singly or in combination.

The kidney is considerably destroyed

2 Extensive dilatation and deformation have taken place with the possible persistence of uncontrollable infection and residual urine in calyces and pelvis inviting recurrence

3 Multiple or dendritic calcult are present which perhaps cannot be completely removed even under a ray control and may serve as nuclei for further trouble

4 Because of general and local symptoms, the kidney though possessing some function may cause chronic invalidism

In these difficult borderline cases, will the individual be better served by a drainage operation with removal of calculi (pyelonephrolithotomy or nephrolithotomy) or by the more radical procedure of nephrectomy? To decide this problem, the following factors should be considered

The mortality of the respective procedures The frequency or hability of the patient to have difficulty with the same Lidney in the case

of a conservative procedure
3 The frequency of secondary nephrectomy

after conservative operations

4 The frequency of complications and sequelæ following these procedures and the duration of convalescence with relation to the patients' economic status

3 The frequency of bilateral nephrolithiasis and involvement of the second kidney by calculous disease after nephrectomy or conservative

operation on the first Lidney

The following is a detailed presentation of the above mentioned factors which I believe should be taken into consideration

In this series there was no mortality alter pyelonephrolithotomy in 22 cases and nephrolithotomy in 16 cases of unilateral disease. The mortality for pyelolithotomy for multiple or den dritic stones in 3r cases was 6 4 per cent Because of the small number of cases, these figures probably do not represent a true picture of the mor tality The statistics from Table I (all cases) may be nearer the true mortality rates for a larger group of cases This is shown by Joly who, sum marizing the collected statistics reported by Cifuentes Braasch Brongersma and Gian Vito Tardo at the above mentioned Congress beld in 1924 found for pyelolithotomy 1 398 cases with 34 deaths, or 24 per cent, for nepbrolithotoms. 2 045 cases with 212 deaths or 103 per cent, and for nephrectoms 1 822 cases with 154 deaths, or 84 per cent While the mortality for primary nephrectomy in this series was 8.8 per cent it is likely that with properly selected cases (Case 1 error in operative indication Case 2 complicated case with ureterocolic cutaneous fistula) the mor tality is lower. At any rate, the mortality of the contrasting procedures is comparable and not of decisive import in unilateral disease

2 and 3 The frequency of the total recurrence and residual recurrence in our carefully, checked up cases, is large. It is approximately 40 per cent for pyelonephrolithotomy and nephrolithotomy in unilateral cases. Mort than one third of the patients with recurrences are well and asymptomatic. Approximately, 50 per cent of the total number of patients operated upon need secondary, operations of which approximately one half require nephrectomy for recurrence, infected. worthless hidneys, or persistent fistulas. The results following pyclonepbrolithotomy and nepbrolithotomy are obviously poor At least with removal of the hidney, recurrences and further

operation for stones are impossible

4 Even without complicated statistical data, it will be conceded that primary nephrectomy is usually a simple procedure and gives less post operative complications than pyelonephrolithotomy or nephrolithotomy. The convalescence is usually much smoother, unnary leak or pensistent fistulas, and postoperative renal hemorrhage are absent. Febrile reactions due to residual infection in a diseased kidney, 1e, pyelonephritis, and phiebits of the renal vein are not present. In cidentally, 4of the secondary nephrectomies per formed were for persistent fistulas' in infected Lidneys following conservative operations. Be sides a smoother convalescence, the average stay in the hospital is shorter after nephrectomy.

This is important from an economic standpoint. 5 It has been noted above that bilaterality was mentioned in 260 per cent of the 422 case histories analyzed. The criteria for classification of a case as bilateral have been stated above More important than the actual percentage of bilaterality is the question as to bow many cases thought to be umlateral when first studied showed involvement of the opposite Lidney at a later date Of 130 patients operated upon for renal calculwith follow up studies of from 1 to 7 years who were diagnosed as umlateral cases on first admis sion, 10 or 14 6 per cent, later presented evi dences of calculous disease on the opposite side. The second Lidney became stone bearing in 13 pa tients, or 15 1 per cent, of the 86 patients who had conservative operations performed on the first Lidney Of 27 patients who were nephrectomized for supposedly unilateral disease and who were followed on an average of 4 years 4 or 14 8 per cent, developed definite evidences of stone in the other Lidney or ureter However in only one in stance (Case 9) or 3 7 per cent was this involve ment of the remaining Lidney contributory to a

Case o No 156912 B. K. aged 22 years presented a bustory of 15-sex durations. She had multiple stones in left left latdney for which a pyelolithotomy was performed. One month later a secondary nephreciman for personal number smus due to thricture at the pyelo-present assperformed. The contractive state of the presentation of the assperformed in the right latery with accurate diverged purposes. Pyelolibotomy with decapsulation was performed but the patient duel on terminal.

fatal outcome

Prope of these factular was caused by overlooked stone fragments.

I proof such the under-since it is a routure procedure on this service to place a temporary ligature around the upper unter when operating on a stone kinder.

In this series, then, involvement of the opposite kidney by calculous disease following nephrectomy for unilateral disease occurred in approximately the same frequency as involvement fol lowing conservative operations Most observers report an infrequent involvement of the second Lidney after nephrectomy Brongersma found that following primary nephrectomy for umlateral calculous disease, involvement of the opposite side occurred in only 1 case out of 53, or approximately 2 per cent Braasch and Foulds found this occurrence to take place in 3 per cent of the cases, Twinem in 4 2 per cent, Rafin in 3 per cent while Winsbury-White found no subse quent stone formation on the opposite side in the 43 patients with unilateral disease upon whom he performed a nephrectomy Winsbury White advises nephrectomy in many cases of unilateral stone, to insure against pyuria, formation of stone in the second Lidney, and continued ill health Joly, in a discussion on calculous anuma, quotes Eliot who found that 23 out of 32 patients (1 c, 72 per cent) with calculous anuma had the opposite kidneys removed for calculous pyonephrosis Despite this excellent indication in favor of con servative operative treatment, he argues for earlier nephrectomy stating that recurrence on the opposite side is uncommon after nephrectomy for stone and is usually found only when the infection has spread from the first to the second Lidney Of 377 patients with calculous anuria, Cahill tabulated 128, or 33 9 per cent, whose opposite kidney was absent, removed, or aplastic Herman and Greene found that while calculous anuma occurs seldom after nephrectomy for conditions other than calculous pyonephrosis, it is rare if the remaining kidney is normal at time of original operation There have been very few cases of calculous anuria seen on this service. This is behaved to he due to the extreme conservatism which has been shown in the operative management of our cases

It is difficult to understand why patients with unlateral disease who have been nephrectomized show subsequent involvement of the opposite side so infrequently when the acknowledged incidence of bilaterality is so much higher (15 to 30 per cent) Whatever the factors are in stone formation, one would think that nephrectomy for calculous disease would not change these factors More in line with our statistics are those of Hellstrom and Cliuentes Hellstrom found in lus previous material that there was between 10 per cent and 11 per cent involvement of the second lathey after nephrectomy and between 6 per cent and 15 5 per cent involvement after conservative

procedures After nephrectomy for staphylococcus stones, the opposite side was affected in 16 7 per cent. From these figures he argues in favor of conservative operation and states that nephrectomy is to be avoided at any price. Cifuentes, who noted bilateral disease in 20 per cent of his patients also had a 13 per cent appearance of lithiasis in the second kidney after observation or operation had been performed on the assumption that the disease was unilateral

Concerning the involvement of the solitary, winey by unrelated disorders following nephrectomy for calculous disease, there is no evidence that such involvement occurs in any greater frequency than in people who have both kidneys It is, of course, well known, that the loss of one kidney is usually of no great significance per se Depending on the experimental animal used it has been found that as little as one-sixth the normal kidney tissue suffices to sustain life (r₄)

Summanzing, in the borderline type of case as has heen outlined, nephrectomy is advised by many because the mortality is not higher, and one can thus avoid the high incidence of recurrence and residual recurrence, complication, and secondary operations with prolonged convalescence and subsequent economic loss found after the afternate conservative operative procedure

The main objection to nephrectomy in unlateral calculous disease is that once a ladney is removed, it can no longer serve the patient, who, because of subsequent difficulty with the remaining kidney, may be in dire need of some additional excretory function. Of these patients 14 8 per cent developed calculi on the opposite side

The fallacy committed in judging what procedure should he used on the hasis of a statistical study is ohvious One never can be sure into what statistical group the individual patient under consideration will fall While nephrectomy may be the method of choice in a majority of questionable cases, as determined by many considerations, it could not be so considered if subsequently, the patient should require additional excretory function due to serious calculous involvement of the previously normal kidney While such later involvement is not common, it does occur and often when least expected It has been the experience of this group (4), that on various occasions, conservative operation on a badly diseased stone bearing Lidney has paid great dividends when later involvement of the second kidney or ureteral blockade made the first kidney the sole excretory urinary organ In addition, an astonishing improvement in function has been observed by almost all surgeons after adequate drainage and conservative treatment of such a kidney

SUMMARY AND CONCLUSIONS

The true recurrence rates in all types of cases for pyelolithotomy, pyelonephrolithotomy, and nephrolithotomy were, respectively, 14 9 per cent, 32 o per cent, and 29 4 per cent while the total rates of the true recurrences plus the residual recurrences were 24 o per cent, 54 o per cent, and 58 6 per cent, respectively. In unilateral cases, the true recurrence rates were 13 o per cent 23 5 per cent, and 23 I per cent, respectively true recurrence rate for all conservative opera tions in the primary stone cases (calcium oxalate or calcium oxalate calcium phosphate) was 8 t per cent while for the secondary stone cases (mixed calculi-salts of alkaline earths) it was

28 3 per cent Of 14r patients followed on whom conservative operations were performed 55 or 300 per cent, had either a true recurrence or residual recurrence while of 88 patients with unilateral disease, 25 or 28 4 per cent had either a true or residual recurrence Not all of these patients had symptoms because of their recurrences. In fact the majority gave no evidence of trouble until roentgenograms were taken There were 31 secondary operations performed or 220 per cent of the original number Of the total number 15, or 10 6 per cent required secondary nephrectomy The total incidence of bilaterality in this series was 26 o per cent Of the patients with umlateral disease 146 per cent had subsequent calculus formation on the second side after the original observation and diagnosis of unilateral disease. 14 8 per cent followed nephrectomy, 15 4 per cent followed pyelohtbotom, 95 per cent followed pyelonephrolithotomy and 23 I per cent followed nephrolithotomy While involvement of the second kidney after nephrectomy for unilateral disease is unusual as judged by the majority of reports in the literature, our statistics show that it may occur more frequently

Notwithstanding several considerations sug gesting the advantages of primary nephrectomy in certain borderline cases of unilateral calculous disease of the kidney it is believed that pyelolithotomy, pyelonephrolithotomy or nephrolithotomy with operative x ray control are procedures of choice and that conservatism should still be the main desideratum in the primary treatment of this condition. It is also felt that the results of the conservative procedures will improve with improvement of operative tech nique and x ray technique (both pre-operative and operative), and with the use of such post operative measures as possibly the high vitamin acid ash diet. The future will certainly bring to light additional aids in the technique of the operative procedures and in the prevention of recurrences, whether true or residual Unfor tunately, once a kidney has been removed, it can never be replaced, therefore every effort should be made to conserve it.

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THE INDICATIONS FOR VAGINAL HYSTERECTOMY

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TAGINAL hysterectomy is not a new operation, but it received scant attention until about 30 years ago. At that time Price of Philadelphia popularized it by leaving heavy clamps on the broad ligaments for 48 hours This technique has lost favor since the advent of the Mayo operation which gives the bladder support and unites the broad ligaments in the midline by ligatures The operation has had transient periods of popularity Abdominal hysterectomy, on the other hand, has constantly been a dependable procedure maintaining its solid po-

sition as the operation of choice

During the past few years the literature has contained many articles advocating more vaginal hysterectomies, increasing the indications, and giving statistics stressing the low mortality rate Tyrone writes, "the indications have gradually extended until it is the accepted procedure in approximately one-half of the cases in which hys terectomy is necessary" Black recommends vaginal hysterectomy "with the full expectation will prove its ment and warthat a few trials rant its more general use" Heaney reports 627 vaginal histerectomies with but 3 deaths, and states "There has never been reported a series of bysterectomies by the abdominal route with so low a mortality rate" In a statistical study by Harns it was found that the mortality rate for vaginal bysterectomy was 2 per cent lower than for abdominal bysterectomy

With such encouraging reports in the literature and the enthusiasm shown by advocates of vaginal hysterectomy, one is led to beheve that this operation is to be chosen whenever possible. It was noted that the convalescence of patients who had undergone this operation was not as uneventful and uncomplicated as a perusal of the literature would lead one to believe It was noted, generally, that the mortality rate was low but that the morbidity was higher than after abdominal hysterectomy The younger patients did not have as smooth a convalescence as the older patients and bad the more serious complications It was also observed that many times technical difficulties arose which could not be foreseen and made the operation more hazardous than even a poorly performed abdominal hysterectoms

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It was thought that a comparative study made between vaginal and abdominal hysterectomies might show the cause of the existing inconsistencies The patients studied were operated upon by a group of 11 surgeons, with enough difference in skill and experience to give results which should be those of an average surgical service. The operative technique varied to some extent, but all the surgeons did some modification of the Mayo operation

A total of 170 consecutive vaginal hysterectomies was compared with 200 consecutive abdominal hysterectomies. In the abdominal group there were 108 supracervical hysterectomies and 92 panhy sterectomies The series were both large enough to permit a fair comparison. No cases were omitted in either the vaginal or abdominal series as it was felt that every case should be included to get an accurate idea of the relative values of the two operations Each patient's postoperative days of morbidity were counted and averaged Due to the observation that the more senile patients had the less severe convalescence, the patients were placed in age groups for comparison The standard of morbidity used was a temperature of 100 5 degrees F or over. beginning with the first day after operation. The morbidity of patients weighing 160 pounds or over in the two groups was compared

An attempt was made to compare the unnary complications Those patients who received medication (urotropin, ammonium chloride, tincture of byoscyamus, mandelic acid, sodium citrate, etc.) for the relief of genito-urinary complaints were recorded and compared A comparative study was also made of postoperative complications The mortality of the two groups was noted and the cause of death ascertained in each case by a postmortem examination (Table

Table I shows the days of morbidity in the different age groups. There was little difference in the days of morbidity between the two types of abdominal operation, averaging 2 9 days Vagmal hysterectomies averaged 47 days of morbidity Rinsman and Sellers observed that morbadity was more prolonged in the vaginal type of hysterectomy Witherspoon and Butler also found this true and found that these patients had the longest bospital stay In the age group of 50 to

TABLE I -AVERAGE POSTOPERATIVE DAYS OF MORBIDITY IN THE AGE GROUPS

Type of operation	Age years	Yee' Jenus	ige years	Age years	Total average
Abdominal panhy sterectomy	30	40	3.0	2.5	29
Supracervical hysterectomy	2.7	1,	20	3.5	2.9
Total abdominal hysterectomy	2.1	3.6	70	3.1	29
Total vaginal hysterect my	4.6	4.5	6.	33	4.7

70 years it is seen that the average morbidity in the vaginal type of hysterectomy is practically the same as that of the abdominal operation and this is the only age group the morbidity of which can compare with the abdominal series. Every patient in this group was operated upon for the cure of procidenta

Postoperative urinary complications were most common in the patients who were operated upon by the vaginal procedure 45 per cent of whom received urinary medication as compared to 25 per cent in the abdominal cases. Harris reported similar findings in his series

A list of the postoperative complications is shown in Table II It is difficult to evaluate a comparison such as this but it is obvious that the complications in the one group are balanced by similar complications in the other group abdominal operations however were done on the most difficult and complicated cases while the vaginal hysterectomies were all done on carefully selected patients. It is logical to assume that due to the monhund condition of some of the pa tients who were operated upon by the abdominal procedure the complications in this group should be expected to he more numerous and severe Since the two series do balance so evenly it is strong evidence that an abdominal hysterectomy is the safer and is fraught with fewer postopera tive complications than a vaginal hysterectomy, excluding cases of procidentia

Wishard and Megenhardt made a study of the residual urinary symptoms and cystoscopic find ings in these same patients. They found that the highest incidence of persistent symptoms is pres ent in those patients who have had vaginal hysterectomies This is consistent with the com plaints registered by the patients examined in the postoperative gynecological clinic. In general the younger patients had the greatest number of residual symptoms Next to bladder discomfort these patients complained of pain in the lower quadrants which was interpreted as being due to tension on the supporting pelvic ligaments. It was observed that patients who had been operated upon hy the vaginal route for procidentia had the fewest residual symptoms and were the more consistently relieved of their pre-operative complaints

Table III gives the mortality rate and cause of death as confirmed by autopsy The abdominal group had a mortality of 1 5 per cent compared to o 5 per cent for the vaginal group Vaginal hysterectomies, as stated, were performed on se lected and uncomplicated cases If abdominal hysterectomies had been done in place of vaginal operations on these patients it is most probable that the mortality rate would have been just as low The 3 patients upon whom the abdominal operation was performed who died had peritonitis, 2 of them presented difficult conditions in which the bowel was unknowingly opened and r, upon whom a total hysterectomy was performed, had a pre-existing cellulitis of the vagina. All of these patients presented technical difficulties which made a vaginal hysterectomy impossible. Two patients had old pelvic infections which caused adherence of the pelvic viseera to the intestine and the remaining patient presented an impacted

Seventy eight patients with procidentia were treated by vaginal excision of the uterus and re pair of the rectocele and cystocele when present. There were 49 patients in the age group of 50 to 70 years who were operated upon for procidentia, and 29 patients in the age group from 31 to 49 years In the older group the morbidity was 3 3 days and in the younger 36 days. The average morbidity of patients with procidentia was 3 45 days and this group of patients had the most un eventful convalescence, fewest complications, and the greatest amount of relief when examined 3 months after operation With the good results obtained in these patients it is evident that a vaginal hysterectomy is a safe, curative treatment in cases of uterine prolapse with the associated cystocele and rectocele, irrespective of the pa tient's age Richardson (9) states, "vaginal hysterectomy possesses distinct advantages over the abdominal route in properly selected cases' and further adds (10), 'an attempt to broaden the scope of the vaginal operation beyond reasonable

TABLE II -NUMBER OF PATIENTS IN EACH GROUP WITH POSTOPIRATIVE COMPLICATIONS

			Abdominal	Vaginal	Per cent	
Complications	Abdominal panh) sterectomy	Supracervical hysterectomy	hysterectomy total	hy sterectomy total	Vaginal	Abdomi nai
Wot nd infection	0	7	16	17*	00	0.8
Circulatory collapse	0	;	1		00	0.05
Pyelitis	1	s	6	5	0 28	03
Peritonitis	1		4	1	0.05	0 2
Rectovaginal fistula	•		•	1	0 05	00
Eventration of the wound	0	ı	1		00	0.05
Postoperative bemorrhage	3		3	3	0 16	0 15
Pelvic abscess	3	•	3	6	0 33	0 15
Thy road crasss	,	۰		0	00	0.05
Vesicovaginal fistula	2	0	2	2	0 11	01
Parotitis	1	•	1	0	00	0 05
Toxic encephalitis	1	•	ŧ	0	00	0 05
Phlebitis	٠	•	•	1	0.05	00
Pulmonary embolism	•	•	•	1	0 05	00
Fecal impaction	۰				011	-00

*Abscess in roof of vagina

limits makes it a mutilating procedure which serves only to discredit it and denotes neither sound judgment nor safe surgery"

The most common indications given by differ ent writers for performing a vaginal hysterectomy were noted and were used in this series in an at tempt to prove or disprove their justification They are (1) elderly patients who are bad risks, (2) malignancies of the cervix, (3) laceration and infection of the cervix, (4) fibroids and fibrosis of the uterus, (5) procidentia, (6) obesity In the series studied all the elderly patients were operated upon by the vaginal route for the same condition, procidentia Since the only other common need for pelvic surgery in the senile is pelvic tumors, which certainly should be removed by the abdominal route, it was thought that the first indication could be omitted Malignancies of the cervix were formerly treated by total hysterectomy, but recent reports (13) reveal that the prognosis is much brighter when radiation is sub-stituted for surgery. This is consistent with the infections of the cervix can be cured much more conservatively (2, 3) than by a vaginal hyster-ectomy, and there is no indication for such radical treatment. The hackneyed argument of carrinoma originating in the remaining cervical stump is still moot, but recent papers show this possibility to be negligible (5, 12)

If a vagmal hysterectomy could be done with case in an obese individual, it would certainly be preferred to an abdominal operation Surgery through a fut abdominal wall with a thick, bulky omentum always makes any operative procedure more difficult and is attended by a greater danger of postoperative hernia, but it is often impossible to determine the presence of masses or fivation of the pelvic viscera when examining a fat individual. The morbidity in the obese was higher in the vaginal series than in the abdominal. There was no death in either group (1 able 1V)

The perils encountered in a difficult laparotomy on an obese individual cannot compare with those present in a poorly selected vaginal hysterectomy if it can be definitely determined before the op-

results obtained in this clinic Lacerations and

TABLE III —MORTALITY RATES IN SERIES

These contracts to the contract of the

1) pe of operation	Number of deaths	Autopsy findings
Panhysterectomy Supracervical hysterectomy Vaginal hysterectomy	;	Peritooitis Peritonitis Pulmonary
Abdominal Vagnal	1 2 5%	embolism

TABLE IV — MORBIDITY OF PATIENTS WEIGHING 160 POUNDS OR MORF

Number of patients	Alxlominal h) sterectomy	Vaginal hysterectum;
Average weight Average mogli, lits	183	174 8
Mortality	4.3	1605

eration that there are no abdominal tumors and that the uterus and adnexa are not fixed so that the uterus can be prolapsed with some traction. the indications for a vaginal hysterectomy may be present. Two cases were encountered in which. at the time the vaginal hysterectomy was performed, pelvic disease which had not been sus pected was found, and could not he dealt with because of its inaccessibility. Three patients, or 8 per cent, in the obese abdominal group developed hernias after operation. In every patient in whom a hernia occurred contra indications for a vaginal hysterectomy were present would seem that an abdominal hysterectomy on a corpulent individual is still safer than the aver age vaginal operation, except in cases of procidentia

Morcellation may be required in order to remove a fibroid of the uterus by the vaginal route This procedure has been advocated by several writers Larkin seems to have a sane and con

servative view on this practice when he states Morcellation which is advocated is a dangerous procedure One never knows when a benign ap pearing fibroid or supposedly benign cyst is har boring a malignant cancer ' One vesicovaginal fistula in this series was due to delivering a fibroid uterus of such large dimensions through the vaging that a portion of the bladder was torn away There can be no argument that an ab dominal operation is to be chosen by the average surgeon in removing a uterine myoma unless it is so small that its diagnosis is difficult Vaginal hysterectomy for the removal of fibroids had the highest mortality rate of any type of hysterectomy in the series reported by Harris

CONCLUSIONS

- r Prolapse of the uterus is the only indication for a vaginal hysterectomy
- 2 The morbidity is higher in vaginal hyster ectomy than in abdominal hysterectomy, except in procidentia
- 3 The smoother convalescence of older pa tients upon whom a vaginal hysterectomy was

performed is explained by the fact that all the patients in this group were operated upon for procidentia

4 Excluding cases of procidentia, the post operative complications and complaints are more numerous in the vaginal group than in the abdominal group

Note -I wish to thank Dr W D Gatch for his aid and suggestions in the preparation of this paper

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EDITORIALS

SURGERY Gynecology and Obstetrics

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DECEMBER, 1937

THE JUSTIFICATION FOR STAGE SURGERY IN TOXIC THYROID DISEASE

AN INCREASING experience with thyroid disease should make one increasingly wary of generalizing concerning it, and it might seem that surgeons from regions in which gotter is non-endemic should refrain from such generalizations altogether. Yet even a rather limited experience permits the comprehension of tendencies, and one tendency seems fairly clearcut today, the use of the stage operation for toxic thyroid disease on rather shadowy indications.

Hertzler has very correctly said that while it is no disgrace to do in two stages what could have been done in one, to reverse the procedure and lose the patient is a very different story. That does not grant, however, a hences for stage surgery in the absence of definite indications. With all its advantages, the two-stage or more than two stage operation can be overdone, and has all the defects of its ments. There are other considerations, aside

from the general principle that less surgery is always safer than more surgery anesthetic, for instance, however skillfully given, implies a certain risk, minimal, it is true, but none the less present and not to be lightly waved aside Every operation, however skillfully performed, has inherent in it certain risks-infection, hemorrhage, shock. embolism, nerve injuries, and similar predictable and unpredictable dangers and catastro-Every convalescence may possibly go astray The patient who is submitted to stage surgery is given an additional safeguard from the standpoint of his toxic thyroid disease That cannot be gainsaid But it also cannot be gainsaid that he runs a double anesthetic and a double surgical risk. In certain cases that double risk is more than justified. In other cases the justification is at least debatable, with perhaps as much to be said on one side as on the other But in some instances, and we are beginning to believe that the number is rather larger than is generally realized. the risk is not justified at all

The question of when stage surgery is warranted in toxic thyroid disease rests first of all upon the premise that the supposed toxic disease is really toxic, and then upon the degree of toxicity. Of the justification for stage surgery in true toxic thyroid disease there can be no possible doubt. Every clinic which practices it bas proved that point again and again, just as every surgeon who does not practice it has proved the point by the reverse method, the cases he has lost, the patients who should not have died. But that all patients on whom stage surgery is done are very toxic, or, to speak frankly, are toxic at all, we do not for a moment believe.

Lord Horder has recently and properly com-

mented upon the madness which seizes us all when the word thyrotoxicosis is bandied about, and has said that, if we must use it, the least we can do is to see that we are not mesmerized by it. His warning might well be heeded in any surgical community Whether it is the tendency of all internes and all young doctors, as well as many older ones, to paint the picture of Graves' disease in all cases of gotter we do not know, but personal expenence and the reading of the literature force us to the conclusion that the tendency is rather general The historian who hegins his anam nesis with the textbook picture of Graves' dis ease in his consciousness is likely to emerge from the endeavor with that same picture on the record, whether it should be there or not

That the differentiation between toxic and non-toxic thyroid disease is always easy we do not for a moment claim. The taking of a his tory in such cases is often fraught with difficulty. Too many patients are prone to exaggreate their symptoms and to furnish any suggested to them. Too many patients seem unable to reply to any question as to their illness except in the affirmative. But it takes more than nervousness it takes more than a story of palpitation, it takes more even than the visible evidence of a tremor to justify the diagnosis of toxic thy rold disease.

The mere presence of protuherant eyes does not establish the existence of exopthal mos. Many persons are horn with such an abnormality and a simple question as to the duration of the supposed pathological change very frequently eliminates it entirely by the revelation that it has been present from birth A high basal metaholic rate, in the absence of other signs and symptoms, is no evidence of anything. The time has long since passed when a single high reading, or even repeated up the readings would be regarded as of mide pendent diagnostic value. But the individual

of limited clinical experience is very likely to missise this test, very likely to hase his diag nosis upon an initial or a single high reading, without regard to the other factors in the case or the environment in which the test was taken

It is important, also, to disentangle the purely cardiac and purely neurologic patient from the supposed toxic thyroid patient That the thyrocardiac, as such, actually exists we would he the last to deny There is general approval of Lahev's stand that opera tion is indicated in this type of case, even in poor surgical risks, stage surgery has brought salvation to many such patients. But we have also seen purely cardiac conditions regarded as of thyroid origin, a lucky chance prevented the personal performance of thyroidectomy upon one such patient who had been treated medically for her supposed toxic thyroid dis ease over a long period of time, and the recol lection of that case averted a similar error in another Neurasthenic patients, again, have heen submitted to stage thy roidectomy, with out henefit, of course, and frequently with actual harm Finally, the differentiation be tween toxic thy rold disease and early tubercu losis, ohvious though it may seem, may be exceedingly difficult

The supposed toxic thyroid patient who is prepared within a week and discharged within a monther after lobectomy, returning within a month or two for a repetition of the perform ance, can scarcely he regarded as a candidate for stage surgery. No truly toxic patient could be properly prepared within so hinef a period, aside from the fact that the use of Lugol's solution would be entirely ineffective within it. It is in these and similar patients that we contend that stage thyroidectomy is resorted to without justification. Multiple surgery is done without indication or warrant when it is done for toxic thyroid disease which is only mildly

or acasede kan و د معن مر ده مر A 60 614 610 600 611 40 M C Potter mars las authory are one on to distal , harry College detail 7,7 The world of the state of the s a net fram & and my leading There are a supply to a stilling a front for and o' you muse programmers which with autibiohn o to . Care of fire ellarmeter growther Can a copper contract war and میس د تا دول سط ری مجاویه باشد من کاره مان می عود دول گذارد به د کردول در در من کارد مان میک داد دان کرمه به مهون مرکل هدود مهی به کهون که کهون که کهدا و مهرکارت سرو مه دیگر کهوده به مهی به کهون که 260/100 May coo Litem h Hatth. 11/10 the sa wateress to a septem of the b of trues or a approved The a Chera Wile off II Spece fitted " we war to a M's galling Le mi la suffer a jung mylens 11 11 11 to strate of the obs Arter wolle A Sea Se Co commi 12.00 I wind there as I have he led to be he had been the led to be the led to Our Hawland's on bunded advancy name PRESTANIO WAY SOMEOUR Mills of the set of the the street of the state of 1 - ye ga of 1 /2 Km April - Perhap Office and prainting as I would do Justice serves Direction Jea of Connectory to to it is no to maken of log ton 3 ray & and a few mental land and a few years to all it agel to a marked a 7 7 7 The A M SAME m k, /m -Out of Come Be to n. 11/10 4 (Awa) so how

Lacumiks reduced in size, of passport (left) Issued April 25 1797 to Nathan Smith and letter from travects of Distrimstill, College, written in August 1796, recall that the establishing of a professorably of theory and practice of Medicine at Distrimouth

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CRATIN

EARLY AMERICAN MEDICAL SCHOOLS

DARTMOUTH MEDICAL SCHOOL

COLIN C STEWART, Ph D, Hanover, New Hampshire

ARTMOUTH MEDICAL SCHOOL was founded in 1797 by Dr Nathan Smith Nathan Smith was born in 1762 at Rehoboth in Massachusetts but in his early boyhood the family settled in Chester, Vermont, across the Connecticut river from Charlestown, New Hampshire, Old Fort No 4 until then because of the French and Indian Wars about the northern limit of safe settlement The upper part of the Connecticut was shortly thrown open for colonization, and settlers from Connecticut and Massachusetts were eager to avail themselves of the new opportunities fact, in 1769 one reason assigned for the selection of the present site for Dartmouth College was that it was the natural center of "more than two hundred towns, chartered, settled, or about to be settled "

Nathan Smith was an officer in the Vermont Militia at the close of the Revolution, and in 1783 he was teaching a district school in Chester where he had an opportunity to witness and assist in an amputation done hy Dr. Goodhue of Putney, Vermont Smith applied for permission to study medicine under Dr. Goodhue and was advised by him to spend a year in preparation, which be did, studying under the Rev. Mr. Whiting of Rockingham, Vermont From 1784 to 1787 Dr. Goodhue was his preceptor and in 1787 he began practice in Cornish, New Hampshire, where be remained for some years, except for the time spent at Harvard Medical School where be received the degree of M.B. in 1700.

The whole of the valley by that time was occupied by settlers to a degree that seems unbelievable at the present time, but a thorough study of any section of the region shows by its overgrown fields and pastures, by its stone walls and abandoned roads, its cellar holes and traces of orchards and gardens, that the country was covered by a close network of roads, dotted at regular intervals with dwellings, few remnants of which survive The dwellers were undoubtedly poor in currency, but none the less well-to-do, for the presence near by of blacksmith shops and small mills made each community largely self sufficient Transportation, judged by present

standards, was difficult and slow, but it is well to remember that narrow hillside roads long since abandoned and overgrown were as good as any for horseback travel. The main arteries of travel were the turnpikes upon which there were regular stagecoach routes with transportation for both freight and passengers. Even for journeys of considerable length no special hardship was apparent for there were many wayside inns where a change of horses could be made.

One reads of various explanations for the abandonment of these homesteads, of the influence of the growth of factory towns, of the coming of the railroads, of the opening of the West to settlement, and of the possible improverishment of the soil Undoubtedly a still more potent factor was a change in the means of transportation Roads that were good for inding were difficult or impossible for wheeled vehicles, and little by little the more inaccessible regions were to be given up Tbe process is still going on with the replacement of horsedrawn vehicles by automobiles Even the turnpless are in many cases now well

nigh impassable

For these widespread and growing communities in Nathan Smith's time there was a scant supply of medical assistance Travel was easy but timeconsuming With very few established medical schools in the United States, the preceptorial system was the recognized method of preparing for practice In Cornish, Smith's success as physician and surgeon was so outstanding that except in the case of Lyman Spalding, it seems to have been physically impossible for him to give adequate instruction to the many applicants for his aid And yet he was acutely aware of the needs of the now thickly settled Connecticut Valley in the region from Cornish north as far as the Ammonoosuc River For these reasons he made application to the trustees of Dartmouth College for approval of a plan to establish a professorship of the theory and practice of medicine Their action in August, 1796, while withholding actual support gave him such encouragement that in December of that year he sailed for Scotland where he studied at Glasgow and Edinburgh, later going to London, sending back books and anatomical and chemical apparatus which were to be used on his return in 1797

The formal action of the trustees establishing the professorship is dated 1793, but the first course of lectures was begun November, 1797, as is witnessed by letters and by his daybook entries for that year Two men were graduated in 1708 The first lectures were given in a building known as the Medical House, formerly standing to the west of the present building, since removed to the southwestern part of the town and still recognizable as part of a dwelling house Later, lectures were given in rooms in Old Dartmouth Hall, but finally in 1810-11 the present "Medical Building,' the oldest of the existing College group, was exected according to Dr Smith's plans, partly by a small grant from the state, but largely at his own expense and on land deeded by him for the purpose There have been many alterations in the original building, notably in 1871-73 when the Stoughton museum was provided for, and later by the addition of a wing for the anatomical laboratory

In 1908 the Nathan Smith laboratory was built to accommodate pathology, histology, bac teriology and pharmacology Courses in em hyology and hological chemistry are given in the laboratories of the College Chinical courses are held for the most part in the Mary Hitcheock Memorial Hospital which was built by Vir Hiram Hitcheock in 1831—93, in response to the efforts and needs of the members of the medical faculty In the beginning Nathan Smith gave all the lectures and his populanty is attested by large attendance. The lectures in chemistry were soon turned over to Rufus Graces and later to Lyman Spaking (founder of the U.S. Pharmacopera). Doubtless this course, one of the earliest of its fund, attracted some of the students of Dart mouth College who registered for the medical lectures.

In 1833, discouraged by the state of affairs that cultimated in the famous Dartmouth Collecticase, Dr Smith considered and accepted an in vitation to be one of the group that gave the first courses at Yale Medical School (He was also concerned in the founding of Bowdon Medical College, 1821) Nathan Smith returned to Hanover to lecture as late as 1856 that his remaining years were passed in New Haven where in 1820 he died

The more maccessible regions are now described except during the summer months. The distribution of the population has changed since Nathan Smith recognized the needs of the northern Connecticut Valley, and the nature of the need has changed, but the region still needs the sumulus and the support of a medical center in order that the earnest practitioners of the countryside may give their best to the people dependent upon them

As was said in the presentation of the College case before the Supreme Court in 1818, Dart mouth "is only a small college but there are those who love it" The same can be said of the medical school

THE SURGEON'S LIBRARY

REVIEWS OF NEW BOOKS

HE second, revised and reset, edition1 of The Diseases of Infants and Children, by Griffith and Mitchell, an old standby in pediatrics. is in many ways a surprising piece of work. Its greatest value hes perhaps in the fact that in one volume so complete a pediatric practice can he included It is well indexed and the hibliographies at the end of each chapter are remarkably up to date It cannot he said in he a new work because it con-

tains much in the text which is of greatest interest from a historical point of view, for instance, the ma terial on infant feeding, moreover, certain phases of pediatrics which are quite live subjects today are scarcely mentioned, notably erythroblastous fetalis Perhaps this is not too serious a criticism in view of the purpose for which this book was designed, it is a typical text and no text on a subject like pediatrics can he maintained up to date, for in a year or two what is now known about these controversial conditions might be quite antiquated

The great value of this book lies in the sound common sense view point taken by the authors, who speak from a background of vast experience and whose judgment, in so far as treatment is concerned, is the sort one would like to have used in his own family Throughout the text are italicized sentences and paragraphs emphasizing the important points in the book

This edition keeps a valued text as nearly up to date as is possible to keep such a work C A ALDRICH.

THE study of diet in relation to cancer is compre hensibly discussed by Hoffman in his recent books, Cancer and Diet The hook is based on 20 years of research and a study of 2,234 question naires from living cancer patients and r,149 non cancerous controls An extended review of cancer literature is included The work is divided into four separate sections

The first section is a historical review of the litera ture from 1777 to the present time The second sec tion deals with statistical facts relative to fined con sumption and the changes which have occurred dur ing recent times The purpose of this section is th illustrate the transition from the use of natural fnod products to modified food products, and to point to the introduction in this transition of many dangerous dietary factors

THE DIBLARS OF INVANTS AND CHILDREN BY J P Crozer Graffith VI.D., PR D and A Greene Witchell M.D. at rev cell Pala delphia and London W. B. Schotter C. and D. and C. and

Section three is a very thorough discussion of the metabolism in cancer as affected by organic and in organic food compounds Here we find many conflicting expert opinions, and this section is a veritable chaos

The fourth section is a tabulation of general facts concerning cancerous patients and non cancerous patients as obtained from the questionnaires mentioned, and the author's conclusion is derived from

There is a 64 page appendix which is an extensive tabulation and summary In its entirety the hook is a valuable accumulation of interesting data and is recommended not only in those interested in cancer as related to diet, but also to those interested in metabolic studies and endocrinology

L M ROSENTHAL

IN this monograph of 214 pages, Putti presents a complete review of the lumbar-sacral sciatic syndrome based upon a study of 1,121 cases It is a compilation of what the author has presented in various papers and lectures with the addition of his more recent studies on the subject

Three pages are devoted to the cervical thoracic brachial neuritis syndrome, and its similarity to the lumbar sacral sciatic syndrome is emphasized. The subject is presented in a well planned manner, beginning with the neuro osseous anatomy of the lumbar sacral region Then the etiology of pain in sacralization of the fifth lumbar is presented with roentgenograms and line drawings made from the films

The author offers several short case histories and comments thereon Before presenting his theories of tropism he gives a good anatomical description of the lumbar vertebræ Roentgenograms, diagrams, and photomicrographs are interwoven in order to elucidate the variations of the planes of articula tions of the facets

Congenital anomalies and arthritis are discussed Several chapters are devoted to arthritis of the articular facets and four colored drawings supple ment the text 'The pen and ink drawings, made from films, complete the picture

The entire subject is clearly and adequately presented in a manner that reveals the author's profound

knowledge and ability as a teacher

In succeeding chapters the problem of lumbar sacral disability associated with radiculitis and sciatica, is considered. Here the examination of the patient is supplemented by photograms revealing the point of buttnek pain in relation to sciatic scoliosis

*LONBOARTRITE E CIATICA VERTEBRALE SACCIO CLIVICO V Putti Bologgia L Cappelli 1016

The symptoms of muscle spasm in scolosis with descriptive line drawings, photographs and reent-genograms, are given Camptocormia and alternating scolosis are clearly described. There are some scellent descriptions of the postural attitudes as sumed to relieve pain. Diagrams of the distribution of the second third and fourth and fifth lumbar and first and second-sarral nerves, aid in understanding the localization of the pathological changes in the lumbar or sacral areas. This is supplemented by reentgenograms and phintographs of the patients

The discussion of nerve involvement includes the sensory, motor and reflex disturbances, trophic changes and sympathetic nerve involvement. All the neurological bindings are correlated with the chinical examination and roentgenograms.

A chapter on diagnous includes a differential of meningtuc muscle spasm with socilosis and ank, losing spondylitis early Pott's disease syphilis neoplasma of vertebral or spinal cord origin disturb ances ducto sacro liac and hip joint pathology intervertebral dise pathology peripheral nerve lesions, and egiatic neuritis

Fifty pages are devoted to treatment which in cludes a discussion of the methods of selection of proper therapy for the individual patient. It covers physical therapy immobilization by casts corests and braces 4 detailed decenpion of the author's method of making removable plaster jackets and the bot air treatment is worthy of careful attention

Surgical treatment considers in detail the indications technique and case reports of lamino arthrections arthrodesis facetectomy transversectiony, and menisectomy for protrusion of the intervertehral disc.

The monograph is excellently and adequately supplied with 114 instructive photographs diagrams
and roentgen reproductions. There are 5 colored
drawings of operative exposures which are excellent.
The literature is freely quoted and a complete
bibliograph appears in footnotes. The monograph
closes with 8 pages on injuries of the lumbar spine
associated with scatatica.

Pinitry Lewis.

WEALTH of information is contained in the A authoritative volume on thyroid gland dis ease by Means The hook represents the experience of a careful student a medical man not a surgeon, who has had the advantages of charity facilities for prolonged medical observation active physiological and clinical research and good surgical co-operation -a combination of advantages rarely found. The Thyroid Clinic of the Massachusetts General Hos pital represents these factors The literary style is worthy of mention it is simple readable and re freshing Specific problems are usually attacked with reference to scientific data accumulated by the author sown research Throughout the book, charts and diagrams present a very extensive material on tby roid physiology and disease

THE THYROD AND ITS DISEARS BY J H Means WD Philadelphia Montreal, Lendon J B Lippincott Co 1937

It will be a pleasure and an education to use this volume for study and reference PALL STARR

A HIGHLA commendable plan is used by Shanda un his Handbook of Orthopate Surgery'in dis cussing general joint phenomena, the cause of pathological changes in bones and joints and physical diagnosis in the orthopedic patient. Congenital deformatics affections of growing bone affections of adult bone, infections of joints and chronic arthritis, are discussed. The author bas stressed the importance of physiological and anatomical considerations in determining the diagnosis and treatment.

The book is divided into 22 chapters in 6 chapters discuss the pathological lesions of orthopedic sur gery 7, the lesions of various regions of the body and r chapter body mechanics and physical theraps.

The book is well planned is easy to read and un derstand, and is a safe one for students. Brevolwhich is one of its chief virtues is at times too great Fundamental facts and principles are given very connected. Controversial points are not discussed but the book represents the concensus of the present day teachers of orthopodes surgery.

The illustrations well selected and well spaced, are chiefly line drawings and diagrams and are most instructive. The illustrations of bursæ are very

effective

This Handbook of Orthopadie Surgery is a valuable book for the student and the practitioner of orthopedic surgery. If for no other reason than its extensive and excellent hishlography it would be well worth its cost.

THERE is no doubt that Bick has done a tre trendous amount of collateral reading in order to place before the profession in so concre a form so much valuable information—both from the his torical and the practical points of view—as is contained in his Source Book of Orthopalici.

The subject matter is discussed under the head ings primitive man and ancent practices middle ages, recassance 17th century rish century, and the modern period Birk discusses physiology pathology, and methods of practice of bone joint and muscle tendon surgery. His descriptions of non operative orthopedies and the rise of orthopedie hospitals and institutions are very interesting and instructive.

The manuscript reads like a story book. The hithlography is in aluable. Every physician should have the book in his library and, when he wants an hour or two of intensely interesting and authorita true reading this is one book that will not fall him.

There has been nothing that compares with this book since the classical Menders of the Maimed by Sir Arthur Keith

*HANDROK OF ORTHOFEDIC SUFCIAY BY Alfred Rives Shand, Ir. B.A. VLD In collaboration with Richard Bevery Rancy B.A. WD 5t. Lour. The C.V. Mosby Co. 1917.

*SOCIET ROKE OF OUTTION DICK. By Edgar M. Bek, M.A. W.D. Baltimore The Vallance O. 1917.

In the symposium on the relationship of trauma to disease, edited by Brahdy, the authors stress the fact that their discussions deal particularly with the effect of a single trauma, either physical or psychic, in evolung, precipitating, or aggravating disease. The book, which should be read with great interest by medical men who devote any part of their time to industrial casualty work, comes at a time when there is a distinct need for such a volume which will serie as a reference book giving the prevalent opinions as to the relationship between trauma and certain pathological conditions. The hook should prove indispensable to men who appear he fore industrial boards or act as medicolegal advisors to the carners of casualty insurance.

A wide variety of medical and surgical subjects is covered, the list of contributors is very imposing and is made up of outstanding men in their special fields. There are no illustrations in the hook. It would be unfair to single out any chapter as being unusually well presented, but the reviewer found the chapter on "Trauma and Diseases of the Spine" unusually illuminating and the chapter on "Trauma and Neoplasms" to contain a wealth of valuable

information

The authors should be proud of this book. One feels confident that the many references which will be made to its contents will be very flattering to the contributors.

R. W. McNeur.

THE recent book* by Tcbaperof presents an dagnosis The author lays great stress on a systematic study of the roentigenographic and roent genoscopic findings, which must be analyzed care fully, step by step Details are hable to he over looked unless such a study is undertaken The author seeks to inculcate and to illustrate by numerous examples, first from a general and then from a regional point of view, how to make a systematic study of the roentigenologic findings in the principal, as well as some of the rarer, diseases

The arrangement of the work facilitates the making of a differential diagnosis. The illustrations are
generous, some perhaps a little larger than need
be, but with practically all of them, one can only
express agreement and approval. The reviewer considers this an excellent type of textbook in radio
logical diagnosis and yet it contains enough milormation to be a valuable book for the desk of any diag-

nostician James T Case

THE relationship of blood pressure to protein intake in the diet is discussed by Haris in High Blood Pressure³ The book gives the results of a tremendous number of laboratory studies made upon

TRAUMA AND DISEASE Edited by Leopold Brahd) BS MD and Samed Akah BS MD Fibliodelpha Lea & Febrer 1997 GENERAL FRACTIONALS BY MALE C. C. TCAMPACT STORMER ME. E. C. TCAMPACT MD MS E. (Camb.) With a foreword by Philip H. Michaer MD MS FR. C. Shallmore William Mood & Co. 1077 GENERAL FRACTION BY MS FR. C. Shallmore William Mood & Co. 1077 GENERAL FRACTION BY MS FR. C. Shallmore William Mood & Co. 1077 GENERAL FRACTION BY MS FR. C. SHALLMORE WILLIAM MOOD ALL CONTROL WILLIAM MOOD ALL CONTROL OF THE STATE OF THE S

various constituents of the blood and urine of pa tients receiving high and low protein diets results of these determinations are given in great detail, but few records are given concerning the clinical findings of the patients under study Dr Harris revives the more or less discarded concept that byper tension is definitely related to high protein intake in the diet. He goes so far as to predict that as soon as the public regulates its mode of living to only necessary dietary requirements, the incidence of "hypertony" will be materially reduced The text makes little mention of other investigators' work in this field and there is a limited bibliography. The author's concept of hypertension is not in accord with the consensus of most modern writers on this subject The book will be of interest only to those who wish to consider the studies of the author con cerning the relationship of hypertension to protein intake in the diet CHAUNCEY C MAHER

THE first portion of Plesch's Physiology and Pathology of the Heart and Blood Vestels' is devoted to a discussion of mathematical details of the book is concerned with cardiac insufficiency with relatively little correlation with the physics which the author previously discussed Belying its title the book contains only minor paragraphs and illustrations of the pathology of the heart and blood vessels. There is practically no bibliography and the index is only fair. The book is well printed but cheaply hound. There is little to be said in recommendation of this text.

CHAUNCEY C MAHER

TWENTY-FIVE years ago Sir St Clair Thomson first published a text based on his own clinical experience and observation in diseases of the nose and throat. It proved so popular and successful that it is now in its fourth greatly enlarged edition. V. E. Negus has contributed the section on diseases of the air and food passages. The book is rather complete, containing 1,000 pages with 400 illustrations and radiographic plates.

Basically the general scheme of the original text has been maintained, effort being made to treat the subject matter scientifically but at the same time to retain its readability and simplicity. The chapters on malignancy of the lary na are especially well written, while that on tuberculosis of the air passages written from the author's personal experience appears to cover the subject rather thoroughly

Undoubtedly this latest edition will prove to be as useful as a text and reference work as the previous editions

John F Delvi

Oxford Medical Publications Physiology and Pathology Oxford Manager and Pathology Oxford Manager and Pathology MD (Grant at R. Denyelsells By John Pleach MD (Grant at R. R. Denyelsells By John Pleach MD (Grant at R. Nose And Direction More and Pathology Oxford And Pathology Oxford MD FR CP (Load) PR CS (Eng.) LD (Hop.) Vinninge (Medican diploned en Soulve Rose and Loadon D Appleton Grant MD FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D Appleton Grant MD (FR CS (Eng.) 4th ed. New York and Loadon D (FR CS (Eng.) 4th ed. New York and Load

The symptoms of muscle spasm in scoliosis with descriptive line drawings, photographs and roent genograms are given. Camptocormia and alternat ing scoliosis are clearly described. There are some excellent descriptions of the postural attitudes as sumed to relieve pain Diagrams of the distribution of the second third, and fourth and fifth lumbar and first and second sacral nerves, aid in understand 10g the localization of the pathological changes in the lumbar or sacral areas This is supplemented by roentgenograms and photographs of the patients

The discussion of nerve involvement includes the seosory motor and reflex disturbances trophic chaoges and sympathetic nerve involvement the neurological findings are correlated with the clinical examination and roentgenograms

A chapter on diagnosis includes a differential of meningitic muscle spasm with scolosis and ankylos ing spondylitis early Pott's disease, syphihs neo plasms of vertebral or spinal cord origin disturb ances due to sacro iliac and bip joint pathology inter vertebral disc pathology peripheral nerve lesions and selatic neuritis

Fifty pages are devoted to treatment which in

cludes a discussion of the methods of selection of proper therapy for the individual patient. It covers physical therapy immobilization by casts coreets, and braces. A detailed description of the author's method of making removable plaster jackets and the bot air treatment is worthy of careful attention

Surgical treatment considers in detail the indica tions, technique and case reports of lamino arth rectomy, artbrodesis facetectomy transversectomy and menisectomy for protrusion of the intervertehral

disc

The monograph is excellently and adequately supplied with 114 instructive photographs, diagrams and roentgen reproductions. There are 5 colored drawings of operative exposures which are excellent The literature is freely quoted and a complete bibliography appears in footnotes The monograph closes with 8 pages on injuries of the lumbar spine associated with sciatica PHILIP LEWIS

AWEALTH of information is contained in the authoritative volumes on thyroid gland dis ease by Means The book represents the experience of a careful student a medical man not a surgeon who has had the advantages of charity facilities for prolonged medical observation, active physiological and clinical research and good surgical co-operation -a combination of advantages rarely found. The Thyroid Clinic of the Massachusetts General Hos pital represents these factors. The literary style is worthy of mention it is simple readable, and re freshing Specific problems are usually attacked with reference to scientific data accumulated by the author sown research Throughout the book, charts and diagrams present a very extensive material on thyroid physiology and disease

THE THYROID, AND ITS DI TASES By J H Means WD Phila delphia Montreal London J B Lippincott Co 2917

It will be a pleasure and an education to use this volume for study and reference

HIGHLY commendable plan is used by Shands A HIGHLA commenced particles Surgery in dis cussing general joint phenomena, the causes of pathological changes in bones and joints and physical diagnosis in the orthopedic patient. Congenital deformities, affections of growing bone affections of adult bone, infections of joints and chronic arthri tis, are discussed. The author has stressed the importance of physiological and anatomical considera tions in determining the diagnosis and treatment

The book is divided into 24 chapters 16 chapters discuss the pathological lesions of orthopedic sur gery 7, the lesions of various regions of the body and I chapter, hody mechanics and physical

The book is well planned, is easy to read and un derstand, and is a safe one for students Brevity, which is one of its chief virtues, is at times too great Fundamental facts and principles are given very concisely Controversial points are not di russed but the hook represents the consecsus of the present day teachers of orthopedic surgery

The illustrations well selected and well spaced are chiefly line drawings and diagrams and are most The illustrations of bursæ are very

effective

This Handbook of Orthopædic Surgery is a valuable book for the student and the practitioner of orthopedic surgery. If for no other reason than its extensive and excellent bibliography, it would be well worth its cost PHILLP LEWES

HERE is no doubt that Bick bas done a tre I mendous amount of collateral reading in order to place before the profes ton in so concise a form so much valuable information-both from the his torical and the practical points of view-as is con tained in his Source Book of Orthopadies

The subject matter is discussed under the bead ings primitive man and ancient practices, middle ages, renaissance 17th century, 18th century, and the modern period Bick discusses physiology pathology, and methods of practice of bone joint and muscle tendon surgery His descriptions of non operative orthopedics and the rise of orthopedic hospitals and institutions are very interesting and mstructive

The manuscript reads like a story book. The hihliography is invaluable. Every phy ician should have the hook in his library and, when he wants an honr or two of intensely interesting and authorita tive reading this is one book that will not fail him

There has been nothing that compares with this book since the classical Menders of the Maimed by PHILIP LEWIN Sir Arthur Keith

*Handrook of Orthopedic Screeny By Alfred Rives Shands, Ir. B.A. M.D. In collaboration with Richard Beverly Rady. B.A. M.D. St. Louis The C.V. Moby Co. 1971. *Sorrice Book of Orthopedica. By Edgar M. Bek. M. E. M.D. Baltamore The Williams & Hilliam Co. 1973.

which concern the heart are classified and discussed at such length that the text requires more than 300 pages. Almost without exception the numerous discussed at some length and there are sections on vasograph; arteriography enography and lymph orgaph; and beautifully reproduced book and should interest everyone concerned in the study of the human heart.

JAMES T CASE

AS stated in the preface by the author Heart Failure's instended primarily for the practitioner. It would increase the knowledge of heart failure enormoustly and would improve the care of cardiac patients considerably if all general practitioners did read and study this new important addition to our medical literature.

The book is essentially an exposition of the various features of heart disease, although some attention is given to the description and enumeration of the ordinary signs and symptoms of beart failure When the author discusses the latter aspect of the subject meompletely he refers the reader to appropriate articles for further study The outstanding contri bution of this volume is that it contains a complete exposition of the physiological and pathological mechanisms involved in the production of the vari ous signs and symptoms of heart failure. With this are coupled clinical experiences that illustrate the points involved. We have had books of a theoretical and others of a purely clinical nature. This has attempted to combine both and has done so with unusual success. The subject of heart disease par ticularly lends itself to this close union for theoreti cal knowledge of the dynamics of the circulation has increased tremendously during the past decade or so and is indispensable for the understanding of the practical treatment of the cardiac patient

The book contains thirty seem chapters. The early ones are given over to a discussion of the in dividual and specific manifestations of beart failure such as dispica deem a cyanosis. These are followed by chapters on the types of heart disease producing the various forms of heart failure. Finally, the treatment of circulatory failure is considered on original articles on subjects under discussion. One can therefore quickly survey the background of problems both chinical and experimental

Although the hook is called Heart Faulure and that is its man theme it contains much useful knowledge concerning heart disease. Particularly impressing is the discussion of the nature and mechan ism of paroxismal dyspine periodic breathing and orthopnea. The entire volume is a splendid addition to the recent publications that have come out in this country on the subject of heart disease. It ought to obtain the same enthiusation reception on the part

of the medical profession as Dr Fishberg's earlier book Hypertension and Nephritis SAMUEL A LEVING

IT has been a pleasure to survey the new edition of a The Operations of Surgery by Robalands and Turner? Since the last edition which appeared in 1027 the medical profession has suffered a great loss in the death of R P Rowlands, the senior author For the past two or three decades Rowlands has been one of the leaders in the field of English surger; and his guiding hand will be much missed at Guy s Hospital, where he has so faithfully served humanity and the medical profession it is of interest to note that this work is the direct descendant of the Opera tions of Surgery by W H v Jacobson which was

first published in 1880
Before his death, Rowlands had revised the chapters on peritonitis, operations on the stomach and duodenum visceroptous and chronic constipation and operations on the mitestines. The chapters deal may with the preparation of the patient operations herma the spleen panereas, and rectum and the verteinal column have been revised by W. B. Ogal vie. The chapters despetting operations on the View The chapters despetting operations on the Country of Country Massie, and A. Rajin Thompson has revised the chapters on operations on the kidney and urted bladder, prostate, urelink, and pemis Portions of the work pertaining to gynecology were revised by G. F. Gibbord and R. C. Brock has rewritten the

section on thoracte surgery.

This work portrays English surgery in an accurate manner as we of the States conceive it, it displays conservatism as well as accuracy. The chief points of interest are a description of the indications as well as accuracy and a suggestion as the contra indications for the proposed operation as accurate and clear description of the procedure, and a suggestion as to what possible complications may be anticipated. Surgical judgment is stressed as well as operative skill since. Technical skill by itself may even he dangerous without the guidance of adequate thousledge and sound judgment. The test is clear and the illustrations are many and strik moly instructive.

The impression is gained that pre-operative and postoperative care are not stressed as much in England as they are in America. The administration of water to maintain a proper water balance is very madequately described and no definite regimen is yen. In America this procedure, is well descloped by Coller and his convolvers, forms much of the basis of proper pre-operative and postoperative care. The intravenous administration of dextrose solution and blood transiassion are rarely mentioned. For the treatment of bihary tract disease and to reduce the congulation time of the blood to normal, the advice which is very briefly given is to administer calcium chloride intravenously as recommended by Malters.

FRCS (Eng.) and Philip Turner BSc MS (Lond) FRCS (Eng.) Sthed Two volumes Baltim e William Wood & Co 1937

in 1922 along with "carhohy drates and water freely by mouth and glucose and water by rectum". It has heen proved that glucose is not absorbed from the colon and many individuals cannot tolerate enough water per rectum so that they may absorb a sufficient amount to maintain a water balance. It basen fairly definitely demonstrated by physiologists that sugar, calcium, and vitamin D are the protective agents for a disabled liver and that every effort should be put forth in their administration to assure the availability of a sufficient quantity of these substances over a period of time

This edition again demonstrates the difficulty in making revisions of extensive works. Much material must be and is carried over lest the revision entail a complete rewriting. Due to this many references are not of recent date. It is noted that the statistics for the results of suprapubic prostatectomy are quoted from Freyer, rgir-rgyz, and those for results of operations for gastric and duodenal ulcers at a somewhat later date but not what the reader would hie.

to know, i e, what are the results now?

It may be an advantage to the experienced surgeon to find occasionally disagreements from what be may think generally accepted principles. Allu sion is made to statements in the discussion of the treatment of appendiceal abscess Relative to a "leak into the peritoneum" incident to the removal of the appendix imbedded in the wall of the abscess which seems to he advocated, the author states "There is only one certain way of preventing this catastrophe and this is by first deliberately opening the peritoneum internal to the abscess, and packing off carefully before the abscess is opened. This advice. I am confident, is contrary to the generally accepted teaching in America and since it emanates from an authority in abdominal surgery warrants study Differences of opinion deserve wholesome thought and often lead to better solutions of problems

This work depicts a conservative attitude although many of the radical and formidable operations are described. It is interesting to note that transurethral resection of the prostate is not men tioned. This procedure which has met with great favor in America is not heing used very extensively in England. A midway position is likely to develop. This work retains the great ment which it has gained in the past and it is hoped that the new collaborators will continue their interest in its perpetuation.

JOHN A WOLFER

A SMALL hook of 133 pages copiously illustrated with line drawings has been written by Spiers' and touches upon practically the entire field of fracture surgery. While the book is not encyclopedic in nature, important aspects are stressed, and the impression is gained that the book is intended to help students and intermes rather than those whose knowledge of this field is more advanced. For this purpose, the book will serve as a valuable adjunct to the standard texts on the subject of fractures.

JAMES K STACK

YN taking one joint and covering it thoroughly as Dr Alhee bas done from the vantage point of his immense surgical experience, this book2 can be com pared to Dr Codman's work on The Shoulder, both being very valuable and full of useful information for an orthopedic or general surgeon 'The hook deals primarily with operative treatment to which the bulk of the script and illustrations is given, but this is founded on an excellent base of anatomy, physiology, and some pathology, together with very helpful and essential advice on technical details of equipment, etc. As usual be makes the procedures advised seem so clear and easy that there is a risk that the uninitiated surgeon may be tempted into the very real difficulties which have a nay of crop ping up in even the most routine of hip operations. The chapter on fractures is by far the best and presents the whole modern group of operative procedures clearly, though be definitely advocates his own bone grafting method Dr Albee has seen the whole development of bip joint surgery and bas made such outstanding contributions to it bimself that he speaks with just authority When he comes to tuber culosis of the hip in its non operative aspects, there is a distinct slackening of interest and a proper bal ance is lacking, which is also noticeable in several of the later chapters which bring the book to a rather abrupt end All in all Dr Albee bas given that extremely valuable quality to the book, namely, that any reader can see clearly that what be says and advocates is his own bonest conviction hased on long and wide personal experience. It is to be hoped that its success will tempt others to deal in the same spirit with other joints or anatomical provinces ROBERT W JOHNSON, IR

14 BRIEF OUTLINE OF MODERY TREATMENT OF FRACTIERS BY H Weldo Speen A B M D Baltmore William Wood & Co. 1937 THE HEST SUSSERS FOR THE HEST SUSSERS AND CORRESPONDED THE HEST SUSSERS AND CORRESPONDED TO THE HEST SUSSERS AND CORRESPONDED

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